The Builder.

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Recent Excavations in the Acropolis.

A FEW weeks past we regretted the long delay of the second part of Dr. Rhomaïdes's work illustrating the now-famous Acropolis excavations. This second part* makes a tardy, but still welcome, appearance. It is now possible to take something like a systematic survey of the discoveries, and to point out their exceptional value for the re-construction of the history of Athenian art. No discovery at all comparable has been made within the last few years; indeed, we may say not since the German excavations at Olympia. The Pergamene marbles, of sensational beauty though they are, and of great mythological interest, only confirmed what we already knew of the florid, overwrought character of the later Asiatic schools. But in the history of Athenian art there has always hitherto been a void that ached inexpressibly. We had our Parthenon marbles, but we knew next to nothing of the art that led up to them. This was the more tantalising, the more unendurable, because literary tradition respecting the early masters of Athens was not wanting; we knew of the existence of Antenor, Amphicrates, Endoios, Hegias, Kalamis, and of the subject of some of their works, but only by precarious conjecture could we picture their style. The famous *stele* of Aristion, signed by Aristocles, was, indeed, the *locus classicus*, and from it, with marvellous ingenuity, a canon of opinion as to Attic characteristics was built up,—a canon now shown to be, in the main, correct. It is true we have not even yet discovered any statue inscribed with the name of a known sculptor; we have a number of bases inscribed, and a number of statues baseless, but as yet no combination has been effected; but the statues found are so many, so clearly marked in type, so manifestly the work of artists swayed by the impulse of a school, that we may safely base our conception of pre-Pheidian art henceforth on the material they afford us.

We can only give a brief summary of some of the chief points of interest connected with them, and we must refer our readers who desire closer detail not only to the work of M. Rhomaides, but also,—preferably as regards the discussion of style,—to an article in the last number of the *Hellenic Journal*, by Mr. E. A. Gardner.

We must begin with a disappointing fact. The statues uniformly represent a draped female figure; but this figure we are unhappily unable to name. We cannot even say if she is a goddess or a human being. Inscriptions were found with the statues containing dedications to Athene. It was, perhaps, at first natural to suppose that Athene herself was represented, but there is positively no evidence for this theory: in fact, much against it, for the statues have no analogy with any known Athene type. The nearest analogy is undoubtedly the frequently-recurring type of the woman goddess, whose wide-spread early worship, specialised later with the cults of Athene, Aphrodite, Artemis, and whose closest affinity is to Aphrodite. But there is no necessity to suppose the statues represent a goddess at all; they may be the images of priestesses or even of worshippers.

We have not space to go in detail through the long series, we must select certain striking examples. Unmistakably the earliest in style, though possibly not in date, for there may have been intentional archaism, is the curious figure given in plate x. This is a good instance of a xoanon, or sacred wooden figure copied in stone. The lower part of the statue is practically a board with drapery indicated on it. This quaint, flat lady is own cousin to the well-known Nicandre figure found at Delos, but the Attic xoanon is a distinct advance on the Delian. Not only is the drapery plainly indicated, but the face is well modelled, the hair elaborately dressed, and the right hand advanced with a lively speaking gesture. The lower part of the arm in this and many other of the statues is inserted by means of a socket, thus of course the trouble of turning the elbow is avoided.

This xoanon lady is unique among the statues, the remainder are worked with a constantly increasing naturalism. Broadly speaking, they are characterised by massive elaborate drapery disposed with but little regard to the figure beneath, but very beautiful from the careful symmetrical arrangement of the folds; very frequently the under-chiton is of fine, wavy, crinkled material; while the over-dress falls in thick, parallel masses. The hair is usually disposed in stiff waves round the forehead and formal curls front and back. Some of the figures wear a wreath. Many of the statues have a very noticeable appendage to the head, consisting of a straight spike of bronze set upright in the crown. M. Kabbadias (the discoverer of the statues) thinks these spikes served to support a disk, probably of wood, which protected the statues from rain. As they were richly coloured, some such form of umbrella would be very desirable. Mr. Ernest Gardner in his paper ingeniously suggests a very probable analogy. It has often been a puzzle how the terra-cotta figurines keep their strangely shaped hats on. These hats have no crown. They are practically flat plates, rising to a point above. They have no visible attachment, and only a hair-pin run *through the head* (for the hair is too flatly dressed) could keep them on. Ladies of all times will suffer strange torments at the shrine of the becoming, but this seems going a little too far. Moreover, these impossible hats are worn by figures already veiled, and therefore needing no head-gear. Mr. Gardner suggests that they are merely a "survival, a reminiscence of the disk that used to protect statues in the open air reproduced in figurines which needed no such protection." The suggestion is an interesting one from the point of view of the terra cottas, because it is another link in the chain of evidence that goes to prove that these figurines were always, even in their most naturalistic days, tinged with ritual reminiscence. But this is by the way.

This is, perhaps, the right place to speak of the elaborate colouring of the statues. They have done no greater service than clearing up the fog that has hitherto rested on the question of colouring as applied to Greek sculpture. As yet no coloured reproductions of the statues have appeared, and, as our own study is based on the phototypes, which are alone at present accessible, we think it wisest to quote the testimony of Mr. Gardner, who speaks from personal observation. He resumes as follows,—"Colour is never applied in mass to a broad flat surface; thus neither the flesh nor the whole surface of the drapery are tinted, but they are left in the pure whiteness of the marble, relieved only with painted details and ornaments. The only exceptions are the hair, which was always of a uniform reddish-brown colour, and occasionally the under-garment; but this was only painted over its whole surface when but a small part of it showed, so that the extent of the colour was not limited. Thus in one case it is dark green, in another dark purple, but in neither case does much of its extent show. In other cases, besides the borders in the places already referred to we sometimes find the whole surface dotted with stars or other ornaments. The wreath* also is generally painted. The commonest designs are the mæander and the palmetto. The colours most used are dark green and dark purple; red and blue are also found. In the nude parts we find red applied to

* Les Musées d'Athènes en Reproduction Phototypique de Rhomaïdes Frères. Fouilles de l'Acropole. Athenes: Karl Wilberg. Londres: H. Grevel. 2nd livraison, 1887.

* Mr. Gardner says "stephane," an absurd hybrid of Greek and English. Why cannot he use an English word when he is writing in English, or else quote the Greek word in its proper form?

the lips and the iris of the eye; the eyebrows, the outlines of the eyelids, and the iris and the pupil are sometimes coloured with dark pigment." We have had coloured fragments before, but no instance in which we could judge of the effect of a coloured statue as a whole. Mr. Gardner unhesitatingly pronounces this effect to be pleasing,—the colouring is so applied "as in no way to obscure the modelling or to hide the texture of the marble,"—it is, in fact, as Mr. Ruskin would say, "entirely honest," and there results from it no displeasure to the understanding, but rather, to the eye, "a richness and harmony of effect that plain white marble would not possess. There is not the slightest tendency to the revolt of modern taste, such as is felt when we see a completely coloured cast; for it is the suspicion of inferior material and the hiding of true surface that most offends us. From the Acropolis statues these objections are entirely removed; in them the colouring adds to the effect of the sculpture, but takes nothing from it."

So far, we have said nothing of the expression in the faces of the statues, and yet it is for their expressiveness that they are chiefly remarkable,—that they are, with one or two exceptions, most distinctively Attic. We have reserved this Attic expressiveness for special consideration in relation to one statue by far the most advanced and the finest of them all (plate xiv). Most of the series owe their expression to the more or less frozen "archaic smile," but this lady smiles her own smile. The mouth is quite naturally moulded, and even the hair is no longer tortured and frizzed, but parted simply in the middle and falling in waves to either side. No archæologist as he looks at this head can refrain from suggesting the name of Kalamis,—Kalamis, of whom we know so much by literary testimony, and simply nothing from monuments. The earth will possibly never give back to us a statue inscribed with his name; but till it does we may be allowed to fancy this Acropolis statue to be an example of that nameless charm which fascinated the ancient Greek and every other art critic. When Lucian fashioned his perfectly lovely woman he gave her the forehead, head, hair, the perfect eyebrows, and the soft moisture of the eyes of the Cnidian Aphrodite of Praxiteles; her wrist and delicate finger she would borrow from Alcamenes, neck, and mouth, and nose from Pheidias, but when all was put together she yet lacked something that only Kalamis could give, "modesty and a sweet, grave, unconscious smile," and a certain seemliness of vesture (*τὸ μειδίαμα σεμνὸν καὶ λελη θὸς καὶ τὸ ενσταλὲς ἒι καὶ κόσμιον τῆς αναβολῆς*). It is the charm that some old-fashioned portraits have, and a very few old-fashioned people, a certain "subdued and refined gracefulness," very rare and very haunting.

For the dating of the series of statues as a whole we are happily not left in doubt. The inscriptions are, from the forms of the letters, from about 525—500 B.C. The whole series of statues were found within a very limited area, stretching from the north-east of the Propylæa to the Erechtheum, close under the Acropolis wall. It is a fortunate accident that with them was found a quantity of refuse used in making the wall. The conclusion seems to be pretty safe that the statues were buried during the building of the wall. The deposit consists of three strata, each separated from the other by layers of wall refuse. From this regular disposition M. Kabbadias concludes that what happened was as follows:—When the Persians laid waste Athens, they burned the temple of Athene, knocked down the votive statues set upon it, upset the pedestals, and did all the sacrilegious damage they could in a short space of time. When the Athenians came back to their desolate city they resolved to restore the temples of the gods with even greater magnificene. But the votive statues, being merely votive, they did not concern themselves about. They used them as material for levelling the surface of the Acropolis. It is possible that, though they did not regard them as sufficiently important to be restored and re-set up, they may have desired by burying them to preserve them from further desecration. The importance of these speculations is that if they are correct they fix the limits of the dating of the statues in one direction. If the statues were buried on the return of the Athenians after the Persian invasion, and if the rubbish layers belong to the Acropolis wall then rebuilt, *they are none of them less than* B.C. 480. Happily, with this dating, both inscriptions and *à-priori* conceptions of style are at one.

NOTES ON THE WALLS OF CHESTER.

BY SIR JAS. A. PICTON, F.S.A.

OWING to the differences of opinion expressed on an inspection of the walls of Chester by the Royal Archæological Institute in 1886, it was thought desirable by some members of the British Archæological Association, at their recent Liverpool Congress, to have as thorough an investigation of the walls as time and circumstances would permit. Accordingly a subscription was entered into to defray the expense of excavating. This was done by consent of the Mayor and Corporation, under the advice and inspection of the City Surveyor, and on the 23rd of August a visit was paid by a considerable number of members and friends.

The following notes were taken on the spot, without any preconceived theory to maintain, or any previous inferences to establish.

The first excavation was made in what are called the Kale yards, at a point a little south-east of the cathedral, which here very closely approaches the wall. There can be no doubt that here the wall is built on the old Roman lines, since there is hardly room for any deviation, owing to the rapid declivity of the land. Here a trench along the wall was sunk to a depth of 12 ft. to 15 ft. below the surface. The lower portion of the wall, which commenced at the bottom of the trench, was rubble work set in mortar or clay,—it is difficult to say which,—in thin layers. This was carried up about 5 ft. Then commenced courses of solid hewn stone in blocks 1 ft. to 1 ft. 3 in. deep, well squared, put together without mortar. This portion started about 6 ft. or 7 ft. below the ground level outside. This stone is of good quality, but a little above the ground-level the wall changes into coursed ashlar of inferior stone, much decayed on the surface.

The next observations were made in a large and deep trench sunk in a timber-yard outside the walls, a little south of the Phœnix tower. Here a large quantity of Roman remains were found loose, consisting of small altars or votive stones, portions of moulded cornices, &c. One flat stone with a memorial inscription was found imbedded in the wall. The solid hewn stone courses here go down to the bottom of the trench without any rubble substructure.

The third excavation was sunk along the east end of the north wall, with very interesting results. The same solid squared substructure was found, with several loose relics of moulded work. Here a peculiarity was observed. From the summit of the Roman wall a little above the surface, the wall was double, with an interval between. This was pronounced to be Mediæval work of uncertain date.

Observations were then taken on the north wall, skirting the narrow valley formerly the fosse, but now occupied by the Shropshire Canal. Along this wall runs the cornice or string course so often referred to. Owing to the precipitous nature of the site it was impossible to gain access to the outside of the wall. Excavations were unnecessary, as the wall stands on the sandstone rock which is here scarped down perpendicularly. The general opinion appeared to be that the greater part of the wall, including the string or cornice, is of Roman origin, with repairs and insertions of subsequent date.

Passing by the water tower, and following the western wall southwards, we arrive at probably the most interesting point in the survey. The Roodee, a grassy plain, now the racecourse, was in the olden time covered with water, and the city wall was carried along the coast line, which here presents a somewhat precipitous face of clay and soil. Here, outside the wall, lie courses of stones of great weight and magnitude. At the former inspection in 1886, it was argued with considerable plausibility that these stones had been laid here to protect the foot of the wall, and prevent a landslip of the bank, and that the city wall retains its original position; but the excavation, carried down about 15 ft. below the surface, presented a very different state of things. It was found that these large stones were merely the upper courses of a strong and massive wall built with square ashlars and carried down to the bottom of the trench. No one could doubt for a moment that this is Roman work of an early period and of excellent quality. What might be the thickness of the wall it is impossible to ascertain without excavations which were unauthorised.

The actual city wall, of Mediæval origin, is not carried up in the plane of the Roman wall, but is set back about 8 ft. to 12 ft. To a minor extent this is the case in other portions of the walls, indicating that at some period, we know not when, the alignment of the walls had been laid out afresh.

Excavations were thus made on the east, north, and west sides of the city walls. Along the south side, abutting on the river, excavations were needless and impracticable.

Without entering into any hazardous speculations, a few inferences may be drawn which appear to be fully sustained.

First, as to the superior quality of the Roman work, both in materials and workmanship.

This was admitted by all who examined it. Whilst the Mediæval facing of the walls is weathered and crumbled so as to require continual repair, the Roman stones which have lain exposed to the weather probably 1,500 years, are as sharp and perfect as when they were quarried, and those built into the walls retain their sharp angles and close joints.

Remark may naturally be made on the absence of tile courses, and of the stones being laid without mortar. The Romans had several distinct methods of constructive masonry, the most solid being that of squared stones called by Vitruvius *Isodomum*, or *Saxa quadrata*, which was employed where strength and massiveness were required. The large stones, possessing stability by their own weight, required little or no cement. The Pont du Gard, one of the finest Roman works extant, has no mortar in the joints. In one of the excavations at Chester a large lump of concrete was found of extreme hardness, consisting of lime, sand, and pounded tile.

Another question arises as to the comparative site and extent of the *enceinte* of the city walls.

Few cities exhibit in their plan more decided evidences of the original Roman castrum than Chester. Comparing it with the details given in the work of Hyginus, "De Castrametatione," written in the reign of Trajan, we find the oblong rectangular plan; the Via Prætoria intersecting the city in its length, crossed by the Via Principalis, with the Prætorium in the centre, now the site of St. Peter's Church. This area can easily be traced, extending from the north wall and fosse southwards to the castle mound and river Dee, and from the existing east wall westward to St. Nicholas-street. This on the western side does not correspond with the existing wall, showing a considerable extension westward, throwing the arrangement out of the symmetry always maintained in the Roman castrametation.

It has been supposed that this extension took place at the beginning of the tenth century, at the time when the city, after lying waste for more than three hundred years, was rehabilitated by Ethelflæda, the Lady of Mercia, but the recent excavations have entirely invalidated his theory. The lower portion of the wall across the Roodee is of the most pronounced Roman character, as noted above. The probability is that the Roodee, having been originally a shallow lake formed by a bend in the river, gradually silted up and shrank away from the walls, and that this extra-mural plot was made use of to enlarge the city on the west side. This part of the city has always been very sparsely built on

and now consists principally of grass-fields, with a few public buildings. This view is confirmed by a recent excavation in the Roodee, which brought to light a wall, apparently a sea-wall or quay of the olden time.

The general result appears to be that the foundations of the walls were built by the Romans, and that a portion of the superstructure still exists, mixed with work of a later period. The Roman work is easily distinguished by the superior quality of the stone. The walls above ground are, for the most part, post-Roman of various ages. After the irresistible evidence of the excavations it is to be hoped that the question is now set at rest.

NOTES.

AMONGST the legislative business on which the Parliamentary session is to be congratulated, there is one which is noteworthy from an industrial point of view, and that is, the issue of a report of the Committee on Forestry, which, though short, is very much to the purpose. It appears that, although the word "forest" does not convey to the modern Britisher the same impression that it did to our forefathers, there are still 27,810,000 acres of woodland in these islands, some belonging to the State, but the majority, private property. Timber is timber, and is therefore comparatively well looked after, generally speaking, as being worth more or less money; but possibly no department of agriculture is so deficient in any systematic knowledge or treatment as that of our trees, and the science of forestry is evidently limited to very few. The State, indeed, appears to be the most deficient tree-owner in the whole country, and a lamentable account of the Deputy-Surveyor of the New Forest, England's grandest possession of its kind, is a proof that the State is no more to be trusted than anybody else in the conservation of its property. There are 40,000 acres lying worthless and unprofitable, because by the Act of 1877 no planting may be done there. Large enclosures of beautiful oaks are over-ripe and doing actual harm, because the same Act forbids their removal. Now, it must be remembered that this same Act was passed by a body of worthy gentlemen who knew nothing about arboriculture, and consequently though really desirous of preserving the forest, defeated their own object from sheer ignorance. The appointment of a Forestry Board and School, such as is recommended in the present report, would prevent all this. We are one of the few countries which never attempt to take care of their woods; and though it is true that the age of wood is very much, though not entirely, superseded by iron and steel, very valuable additions may be made to English acreage, not only by looking after and improving the trees that still remain, but by re-clothing our bare hills in Ireland and Scotland, if the recommendations of the Committee be attended to in good time.

THE scheme of the Charity Commission for the administration of the funds of the British Institution is now published. The most satisfactory feature about it seems to be in the steps which have been taken to ensure periodical publicity for the doings of the Trust. The statements as to what is intended to be done are rather vague; they only amount to this, that the Trust shall establish scholarships, to be called "British Institution Scholarships," of such annual value as they shall think fit, between the amounts of 50*l.* and 100*l.*, towards the encouragement of the study of art; which scholarships shall be awarded as the result of examination "or otherwise, as the trustees think fit." No scholarship is to be awarded to any candidate whose circumstances are not, in the opinion of the trustees, such as to render him or her a fit object of such benefit." This seems a most extraordinary clause to append to a scholarship attainable by merit. It is generally supposed that when a scholarship can only be obtained by working hard to surpass others, this question rights itself, as only those to whom pecuniary assistance is of importance will go through the necessary trouble to obtain it. Here, according to the wording of the scheme, we shall have men incited to give proof of their proficiency first and then furnish proof of their poverty afterwards,—a most invidious kind of requirement, which will certainly be likely to keep out of the field people who are much hampered with that troublesome quality called self-respect. There is not a hint as to the nature of the manner in which the holders of scholarships are to apply the assistance beyond the cloudy statement that it is for the encouragement of the study of art. The representative trustees who are to administer according to the terms of this remarkably unbusiness-like document, are to be appointed as follows:—One by the Science and Art Department of the Committee of Council on Education for England and Wales; three by the President and Council of the Royal Academy of Arts; one by each of the following bodies,—the Royal Scottish Academy, the Royal Hibernian Academy, the Royal Institute of Painters in Water Colours, the Hebdomadal Council of the University of Oxford, the Council of the Senate of the University of Cambridge, the Senate of the University of London, and the Council of University College, London. This is in more ways than one an unsatisfactory list. The University bodies referred to in connexion with Oxford, Cambridge, and London, have no special claim to understand how art is to be taught or learned; their representatives will in all probability be merely persons with æsthetic "fads" of some kind or other. The Royal Institute of British Architects is, as usual in documents of this kind, entirely ignored, and we presume architecture, which, more than any art, requires means in order to travel and study it fully, is to be practically ignored as well as its representatives. The Institute of Painters in Water Colours, we understand, have declined to appoint a representative; and under the circumstances, we can hardly be surprised at their decision.

THERE has been some mournful correspondence in the *Times* last week in regard to the modernisation and spoliation of Venice. One correspondent anticipates that the steam-launches will soon entirely drive off the gondolas; another writes that this consummation must be still far distant, inasmuch as the smaller side canals, with their low bridges, will not afford passage for the steam-launches. Both correspondents mourn over the disfigurement of the palaces by advertisements and of the canals by ugly iron bridges. Here we are entirely with them, for just the same reason that we object to ugly iron bridges on the Thames, and to vulgar and disfiguring advertisements on the buildings of any city,—of course *à fortiori* when the architecture to be disfigured is in itself of exceptional interest and beauty; but otherwise the principle is the same in London as in Venice. But where we cannot agree with the mourners is in the idea that it is the duty and the interest of the Venetians to keep their ancient city *in statu quo*, to erect no new buildings and to make no attempt at reviving or stimulating commercial prosperity, in order that Venice may remain as a picturesque spectacle for visitors. We have no right to require of the inhabitants of any old city that they should be content to reduce themselves to the condition of the custodians of a museum of art and archæology. We question very much even the argument that it is to their interest to keep it so, in order to attract the foreigner and his gold. It is never to the interest of any community to remain in a fossilised state. Let not the reader imagine for a moment that we are indifferent to the disappearance of the ancient charm of Venice. To our natural feelings and associations this gradual dragging down of the old poetic places of the earth into the light of common day is a thing to grieve over from the very soul; it is the extinction of an interest which can never be replaced. But it is inevitable, except under conditions which we have no right to wish for. Human society, with its living interests, is more, after all, than even old buildings. Better see Venice the seat of an energetic and active community, than a decayed society accepting alms as the showman of its decaying buildings. Only, let the modern Venetians endeavour to carry out their improvements in a manner worthy of the beauty of their ancient city. That, at least, may fairly be required of them, in their own interests as well as in those of the rest of Europe.

A RATHER peculiar railway-rates difficulty has arisen through the opening of the Hull and Barnsley Railway. In order to make the position of affairs understood, it should be stated that, prior to the opening of the new line, the rate for coal to Hull from all South Yorkshire collieries within a certain radius was 3*s.* 1*d.* per ton, nearly the whole district being served by the North-Eastern Railway. A speedy effect of the competition was a reduction of 3*d.* per ton in the rate, a similar concession being afterwards made in the case of the West Yorkshire collieries situated on these two lines, which had previously been subject to rates varying from 2*s.* 3*d.* to 2*s.* 11*d.*, according to their position. Other benefits have resulted to the collieries served by these rival lines, in rebates for use of wagons, &c., and, so far, the competition between the two companies would appear to be advantageous to the Yorkshire coal business. But it will be seen that, as is frequently the case, the benefit is obtained at some one else's expense. Many of the collieries on the Lancashire and Yorkshire Railway, who formerly had a share of the Hull coal trade, are now rendered almost powerless to compete, as they are unable to get reductions in their rates corresponding to those of their more fortunately-situated neighbours, and the same applies to those collieries from which coal is conveyed to Hull by water. The competition between the two companies is doubtless restricted to their own systems, and they would probably combine to keep up the rates on traffic coming to them from lines having no direct connexion with Hull. Be this as it may, the result is a fair illustration of the saying that "one man's meat is another's poison," some of the coal-owners being so handicapped by the benefits resulting to others from this battle of railway rates that they are quite in despair. In the meantime, the railway companies serving the Kent district are certainly losers in the new competition for the fruit traffic, to which we alluded some weeks back. The vessels chartered by the fruit-growers now run from Sandwich to London and back three times a week; and the hop-growers, in spite of the concessions they obtained last season, are about to avail themselves of this means of transit, and expect to effect a considerable saving by it. The success of this venture will naturally stimulate the efforts of those who advocate the extension and improvement of our waterways with a view to reducing transit charges.

WE print in another column a letter from a correspondent in the neighbourhood of Bath, which is worth the attention of those who feel concerned in promoting the proper carrying out of sanitary legislation. Our correspondent, Mr. Abercromby Wilson, it appears, has repeatedly drawn the attention of the Rural Sanitary Authority of the Bath district to the offensive state of a ditch which runs close past his and other dwelling-houses, and which removes, among other pleasant matters, the refuse of a brewery. He complains that not only has the Sanitary Authority (?) omitted to take any action in the matter, but that when another resident offered to obtain at his own cost the opinion and report of a competent sanitary engineer, the proposal was received only with ridicule. We should like to know whether the Rural Sanitary Authority in question can state another side to the case which would alter the aspect of it. On the face of it as it stands, it appears that the Sanitary Authority in question is neglecting an obvious duty.

A WORK of some importance has just been completed at Kinsale, viz., a large quay on the west side of the harbour, running almost the length of the town. It is faced throughout with concrete, and has landing-places and a pier-head. It undoubtedly adds very considerably to the advantages of Kinsale as a port of discharge. But though the Bay of Kinsale, if we may thus describe the estuary of the Bandon river on which it lies, is as fine a harbour as could be desired, it is irretrievably handicapped by its proximity to the still more magnificent harbour of Queenstown. It is not an hour's sail from the one to the other, and thus practically all the merchant shipping goes either to Queenstown, or, still higher, to Cork. The mainstay of Kinsale is the mackerel fishing in the spring, when scores of craft lie in the bay and make it their headquarters for the season's fishing. But the quay in question is larger than is necessary for the discharge of fish, a good deal of which is taken off the boats at sea by steam carriers. There is also a tendency in the fishing-boats to go westward, where a good deal of the fishing itself is prosecuted. The opening of the new fishing schools at Baltimore, united to this tendency, is thus likely to decrease the traffic at Kinsale. The useful and important work to which we have alluded is thus not likely to be of the use for which its size and character fit it, and we fear that the future prospects of Kinsale, whether as a fishing or a general port, are not very bright.

WE have more than once drawn attention to the re-organisation of the publications of the German Archæological Institute, by which the centre of gravity of the Association is shifted from Rome to Berlin. The change was clear gain to archæology, at the same time it obviously somewhat left the Italian element of the Institute out in the cold. This has acted as a stimulus to local effort, and it is now proposed to form an Italian society with the title "Instituto Archeologico Italiano." The scheme was broached some time ago in a letter by Signor Ruggero Bonghi to *La Cultura*, and it has since received the adhesion of many noted Italian archæologists, *e.g.*, Fiorelli, the Director of Antiquities; Comparetti, Gozzadini, and others. The Roman archæological harvest is certainly plentiful, and will no doubt supply material for a new archæological periodical, but to the outsider, ignorant of local obstacles to co-operation, and burdened with subscriptions to countless Bulletini, Mittheilungen, Notizie, Musei, &c., the prospect of this new departure has its gloomy side.

AT the last meeting of the Archäologische Gesellschaft, at Berlin, a report of the final completion of the Olympia Museum was laid before the members. The King and Queen of Greece have given the new building the formal sanction of their presence. It stands on the slope of the hill Druva, on a terrace naturally formed. Its plan comprises a large central hall, two stories high, two side halls, and four corner rooms. The central hall is approached by a good-sized entrance-hall, with staircases to a clearstory gallery. The building is just large enough to allow of the pediment groups being set up in their natural disposition along the side walls. They are arranged according to the scheme proposed by Dr. Curtius, but Dr. Treu's variant scheme can be studied on the cast model placed for the purpose near at hand. It has been decided not to place the Nikè of Pœonios at its full elevation. The reason is not apparent, as the height given by the clearstory gallery is amply sufficient. The metopes are placed in one of the lateral halls, plaster casts of those found in the earlier French expedition, and now in the Louvre, are added to complete the series. Of course, the chief interest of the ordinary visitor centres in the little room which enshrines the Hermes. Up to the present time those who have made the pilgrimage to Olympia have seen the god lying flat on his back,—or rudely propped up. It was long undecided whether he should be placed on a new pedestal or whether the old original base should be mended up. We are glad to find this latter course has been adopted. Still more satisfactory is it to learn that, spite of the current reports to the contrary, the statue has nowise suffered from exposure. The faint traces of red on the hair are still visible. Our account of the Museum is taken from a letter by Mr. Alfred Emerson to the *American Journal of Archæology*, and from a report of the Berlin meeting in the *Berliner Philologische Wochenschrift* of August 20.

WE recently drew attention to the remarkable series of marble statues found last spring on the Acropolis and just published in the second number of the *Musées d'Athènes*. We perforce passed over in silence a bronze statuette discovered in the same site and of even greater interest, because unique of its kind. Descriptions of this remarkable monument had reached England, but neither photographs nor drawings were procurable, the only accessible reproduction at the time being a rough woodcut in a Greek local paper. We are glad to find that in this month's issue of the Ἐφήμερις Ἀρχαιολογική full justice is done to this most curious and, in its archaic fashion, beautiful statuette. In πίναξ 4 the figure is reproduced in its two side views, and Dr. Staes accompanies the plate with a full description. The statuette was found immediately opposite the north entrance of the Erechtheum. It is about 15 in. high, and represents the goddess Athene wearing her ægis. The great point of interest about it is its very peculiar technique. It is almost flat, and, in fact, consists not of a figure worked in the round, but of two plaques of gilt bronze in very low relief, nailed together; it seems possible that between the two plates there may have been a piece of wood, to which they were nailed, and which has, of course, decayed. Portions of the figure,—*e.g.*, the feet and right arm,—are worked almost in the round. The right side represents the figure, though not the face, almost three-quarters round; it is the best preserved, and the most carefully worked; probably it was intended to be most clearly seen. On the left side the ægis hangs much further down than on the right. The face on both sides is absolutely in profile. The whole figure is slim and graceful. The goddess is represented as advancing probably to meet a worshipper; her right hand may have held a phiale. It is difficult to say what purpose the figure served. There is a hole at the top of the head and several other traces of attachment which seem to point to the conclusion that it was nailed to some piece of furniture. No specimen of similar technique is known in any other European museum.

IF we may credit all that has been written on the subject lately, yet another Dagon of our youth is marked for overthrow. Returning from his missionary labours in China, the Abbé Larrieu has published a pamphlet (Paris: Leroux) to show that the Great Wall of China not only does not, but never did, exist. We were diligently taught how, in the year 214 B.C., Che-Hwang-te, of the Tsin Dynasty, "first universal emperor" of Cathay, began his project for everlastingly resisting attack by the hordes of the Heung-noo. Countless maps delineate his vast wall, some 1,300 miles in length, bounding the northern confines of Kan-suh, Shen-se, and Pe-che-le, and running from the province of Kan-suh to Tin-yee, on the Gulf of Lias-long. We call to mind many an illustration of its towers and intermediate curtains as they gradually disappear in direct course over the distant mountains and valleys. We are now told that all this embellishment is due to one Martini, a Jesuit priest, who visited China in 1650. His accounts have been copied by one writer after another. The Abbé avers that his precursor quite misinterpreted the signification of what the natives, in their ignorance of another tongue, called their Wan-li-chang,—the wall of a myriad li, or miles. He opines that the imperial scheme for a northern barrier, whilst certainly begun, has never yet been accomplished. Here and there along the line exist certain walls, but these, he contends, are either village fortifications or, at most, for use only as barriers in the particular defiles where they stand. The towers remain, he admits; but these, we are now told by the Abbé, were never connected together by solid masonry of any kind, are far asunder, and are constructed of earth, faced in some instances with brick. On the other hand, one or two correspondents of the daily papers write to say that they, as well as Mr. William Simpson, have not only seen some miles of the wall, but have sketched and measured it.

A NEW archway has just been built in lieu of the wooden gate which opened into King's Bench-walk, Inner Temple, from out of Tudor-street. It stands on the spot which we once hoped would be chosen for the re-erection of the stones of Temple Bar. The roadway here passes between Nos. 6 and 7, King's Bench-walk, whereof the outer walls have in part been rebuilt. Mr. Arthur Cates's design has been executed in Portland stone, under the direction of Mr. W. Oldrieve. It comprises a Palladian arch, between a side doorway and a two-storied tower, intended for a keeper's lodge, octagonal on plan. To secure free way to the lodge door the north-eastern corner of No. 7, in the Walk, has been splayed off. On the keystone's outer side is carved "1887." Over the side door-way is a panel carrying the ancient cognisance of the Templars in their humility, which is now commonly represented by the Pegasus, in a cinquefoil, of the Inner Temple. The carving is supported by two small shields bearing the coat-arms of the late and present Treasurers of that Honourable Society. Were the octagonal tower repeated on the northern side we should have a gateway somewhat like to that, perhaps designed by Thorpe, on the great north road at Burghley House, by Stamford.

AT a meeting held on Wednesday, 24th August, in the Brixton Hall, a committee was appointed to urge upon the Lambeth Vestry and the Metropolitan Board of Works the importance of securing Raleigh House grounds as a park for the people. This finely-timbered pleasaunce, about 12½ acres in extent, was bought in at a recent auction for 39,000*l*. It is understood that it may be purchased for 40,000*l*., one half of which the Board of Works would be asked to contribute. The old property,—being a traditional home of Sir Walter Raleigh and situated in what was then known as Allington Hundred,—lies adjacent to Raleigh Hall, upon the northern slope of Tulse Hill. The river Effra, now flowing as a sewer, ran through the grounds, and a subterranean passage communicated with another old mansion upon the opposite side of the highway. Raleigh may justly be claimed among the worthies of Surrey: his memory is associated with West Horsley (where, in the south aisle of St. Mary's Church, it is said, his head lies with his son Carew); with Mitcham, where he sold his house for 2,500*l*. on proceeding to Guiana; and with Beddington. At Beddington Park, once the seat of the Carews, the orange-tree was first cultivated in England, the plants being grown from some seeds carried thither by Raleigh to his kinsman, Sir Francis Carew. We learn that a neighbouring and much more extensive estate, that of Brockwell, or rather Brookwell, Hall, is likely to be soon in the market, but this could only be rescued from the builders at a price of say about 100,000*l*. Meanwhile an effort is being made to secure, for Vauxhall, the Carroun House and Lawn estates, which the freeholder, Mr. Cobeldick, has consented to sell for 47,500*l*.

MR. JAMES EMERSON, of Northallerton, has bought, for 80,000*l*., the remainder of Lord Ailesbury's Yorkshire estates. This portion consists of the Whorlton-in-Cleveland Castle and Swainsby property, in the Stokesley Union, North Riding. It embraces twenty farms with homesteads, and covers in all nearly 5,900 acres, whereof one-half is moorland. The rental is calculated at about 3,000*l*. a year. The whole estates have thus been disposed of

by the trustees for a total sum of 532,000*l.* Whorlton Castle formerly belonged to the Barons Meinill, and is believed to have been first built *temp.* Richard II. Over the main entrance are the arms of D'Arcy, Grey, and Meinill; but even in Camden's time the castle was old and in ruins. In the northern chancel wall of the older church of Holy Cross is a highly-ornamented canopy, beneath which is the oaken effigy of a knight, cross-legged. This is believed to be the monument of Sir Nicholas de Meinell, who, *temp.* Edward I., held the manor by fee of giving to the archbishop of Canterbury a drinking-cup for use by his grace on the day of his consecration. In King Charles I.'s reign the barony of Bruce of Whorlton was bestowed (August 1st, 1641) upon Thomas Bruce, third Lord Bruce of Kinloss and first Earl of Elgin. For services in the royal cause his son Robert was created Earl of Ailesbury, in the peerage of England, March 18th, 1664. He was ancestor to the Marquesses of Ailesbury.

WE lately had occasion to examine a variety of prints illustrating Inigo Jones's Church of St. Paul, Covent-garden, as it appeared before and after the fire of about ninety years since. The drawings comprise those by Hollar, John Sellar, C. Campbell (a full set, to scale), T. Malton (May 21, 1774), A. Pugin (plan, to scale, November 1, 1823), J. Maurer, Hogarth, &c. All of these, though one of Hogarth's imperfectly, delineate the eastern end of the church as resting upon a platform or base, which is mounted from north, south, and east by flights of steps that are made within the area of the stylobate. Hogarth's print, being "Rich's Glory," shows a range of steps between the two inner columns, only, of the pediment, which is plainly an error. The steps, the two eastern doorways, and, within our own memory, the railing, have been removed. Whilst the roadway at Covent-garden is practically horizontal, the fall being 7 in., southwards, across the whole width of the church, the church's present condition here gives some idea of the effect that would result from removing the steps now at the western front of St. Martin's-in-the-Fields.

THE Metropolitan Board of Works seem anxious to do all they can to prove (what required very little proof) their utter unfitness to meddle with London architecturally. Their proposition for treating the central space adjoining Piccadilly-circus, about which a question was asked in the House of Commons by Mr. De Lisle (who seems to be a member who may do good service in regard to artistic matters), is simply idiotic. Here is a fine open space obtained in a crowded and central position, and the Board propose to block the traffic and shut out the possibility of a fine architectural *place* by putting in the centre a shapeless block of shops, presenting no architectural form, meaning, or beauty of any kind. If, as asserted in an evening paper, this is the scheme of the new Architect to the Board, Mr. Blashill ought to have known better, and we fear that his undoubted capacity for the office in a practical sense is not supported by the degree of architectural taste and feeling which are desirable in an official who may have so much power over the architectural treatment of new sites in London. Mr. Alan de Tatton Egerton, who answered Mr. De Lisle's question, said that though several schemes for dealing with the space had been before a Committee of the Board, no decision had been arrived at.

WE quote the following ominous paragraph from the *St. Albans Times*:—

"THE ABBEY.—An ugly crack is visible above the eastern arch of the tower, both on its eastern and western face. It appears to the non-professional eye as though the south-east pier were sinking again. Possibly the alterations to the south transept have weakened it, or it may be that the increased weight in the tower is beginning to tell. It will be remembered that some years since additions of great weight were placed in the bell-chamber, and again, after the weight fell from the chiming apparatus, a new floor was added to the belfry, and a great many loads of gravel were placed between that floor and the old one. Or can it be that the new cracks are wanted to prove the necessity of some other startling innovations in the way of 'restoration'? Experience teaches that when one part of the church approaches completion, some other part is found to be in a dangerous state and to urgently need attention! There seems to be only one opinion with regard to the wretched substitutes for the old turrets on the south transept, and that is that they are exceptionally ugly. It is to be trusted that whatever is done to secure the safety of the tower no attempt will be made to alter the character of the grandest Norman structure in England."

We are glad to observe that all the local papers are not under the thumb of Lord Grimthorpe. The tower is not perhaps truly called "the grandest Norman structure in England"; architecturally there are others that are finer objects; but it is unquestionably the most historically interesting and valuable. We have no doubt, however, that Lord Grimthorpe would be delighted to find an excuse to pull it down and set up a new tower designed by some clerk of works who would be willing to take his money and allow him to call himself the architect of it, unless something is done to tie his hands or those of the legal custodians of the building who have let him loose upon it.

LETTER FROM PARIS.

THE monument which a committee has proposed to erect by subscription to Sergeant Bobillot, who was killed in the Tonkin war, has given occasion for a competition which was decided during last month. Only nineteen sculptors responded to the invitation of the Committee, to whom the City authorities had lent one of the rooms of the Hôtel de Ville for the exhibition of the drawings. The small number of competitors and the weakness and want of originality of most of the designs are results not in favour of the principle of public competition in cases of this kind. The leading sculptors do not care about spending their talents on the chances of a competition, and the juries, to say truth, are often far too much swayed by private interests or partialities. In this case great surprise has been felt and expressed that the design by M. Choppin should have been passed over. This sculptor was associated in the matter with M. Constant Bernard, Secretary of the Société Centrale des Architectes, who designed the pedestal, and the whole work was generally pronounced the best realisation of the character of monument required. But the jury, in which the political element was rather predominant, decided otherwise, and gave the prize to M. Auguste Paris, the author of the mediocre allegory of "1789," which was bought by the Municipal Council from this year's *Salon*. The statue by M. Paris, a commonplace affair, is to be cast in bronze and erected on the Boulevard Voltaire, on a pedestal of which the principal face shows, among palms and laurels, a sabre, leaves of paper, and a pen, in recognition of the fact that the young sergeant formerly belonged to the Parisian press.

At the École des Beaux Arts, the competition in construction has closed without any "première médaille" being awarded. The second-class medals have been awarded to M. Vallat, pupil of Douillard; M. Emery, pupil of M. Pascal; and M. Jost, pupil of M. André.

The competition for the painted decoration for the Mairie of the Sixth Arrondissement will be closed on the 30th of November.

There are to be placed, opposite the principal façade of the Hôtel de Ville, on two of the pedestals formed in the boundary-wall, two statues in bronze, of which we have already spoken, representing Art and Science; the first, which figured in this year's *Salon*, being by M. Marqueste, the second by M. Blanchard. Artistic merits apart, it is generally agreed that the municipal palace would be better without these seated figures, which do not harmonise with the general style of the building. It is with these statues as with the lamps which have been placed on other pedestals in a similar manner; their outlines cut across the lines of the façade in an unfortunate manner. The Parisian building authorities, who formerly placed these adjuncts there at the suggestion of Viollet-le-Duc, are now regretting it, and are rather disposed to make a clean sweep of them: certainly no one would complain. If one is bent on reproducing an ancient building on its old lines, it does not answer to embellish it afterwards with statues and ornaments which are out of keeping with the harmony of the structure, and Ballu made a mistake in adding to a façade in so pure and elegant a style a series of adjuncts the uselessness of which is daily more obvious.

Internally, the sculptural decorations of the immense Galerie des Fêtes is being pushed on in preparation for the balls and entertainments of the winter. The decorative portion of the ceiling is executed by M. Corboz. Many sculptors, among whom may be named MM. Moreau-Vauthier, Granet, Berthet, Perrin, Croisy, and Marioton, are completing their models of caryatides and seated figures to go along the coves and around the spaces which are intended for pictorial decoration. On its part, and before separating for the vacation, the artistic committee of the Hôtel de Ville, of which we spoke in our last, has commissioned the two architects, MM. Deperthes and Formigé, to prepare, with the assistance of M. Lavastre, a general project of decoration, comprising this same gallery, the Salle des Caryatides and the neighbouring rooms, as well as the grand staircase, of which the ceiling has already been painted by the lamented Baudry. This same committee has resolved to utilise, in some of the reception-rooms, some of the fine tapestries belonging to the Municipality. Among the finest of these are "The Passage of the Granicus," and the "Entry of Alexander into Babylon," executed after the designs of Lebrun; two absolutely priceless fabrics, entitled "Les Chasses de Maximilian"; and lastly, the tapestries called "De St. Gervais," which had been improperly sold, twelve years ago, for the benefit of the church of that name, and the restitution of which to the Municipality was the occasion of a curious lawsuit, about which the art journals of that date were much interested.

Apropos of tapestries, the special museum of the Gobelins has been enriched recently by the acquisition of the Egyptian tapestries found in 1885 by M. Maspéro at Panopolis, near Thebes, where the first Coptic Christians of Egypt were buried. These very ancient pieces of work, which have been lately purchased by the State, are of great interest. Certainly, neither perfection of drawing nor variety of colouring can be looked for in these ancient examples, nor do they display the art and science of modern tapestry work, but in solidity and excellence of manufacture they show that modern industry has added nothing to this class of manufacture.

M. de Ronchaud, whose death we recently announced, has not been replaced at the head of the national museums, but there is talk of giving the appointment to the actual Directeur des Beaux Arts, M. Kaempfen, who has for many years been well known as an art-critic under the name of "Xavier Feyrnet." In the meantime the void is filled, as far as the Louvre is concerned, by Admiral Paris, curator of the Musée de Marine, who has very naturally profited by the occasion to enlarge his own special department; but this provisional appointment is not likely to be permanent, and the worthy Admiral, whatever his technical knowledge in his own branch of work, is hardly equal to the situation of curator of a great art museum, a post which requires special faculties and special experience.

At the Gare St. Lazare the officials are now installed in the new pavilion at the angle of the Rue de Rome, and all the houses situated between the street and the Place du Havre are now in course of demolition to make room for the grand court, towards which M. Lisch is to erect a new façade, terminated, at the angle of the Rue d'Amsterdam, by a pavilion similar to that of the Rue de Rome. The result of this arrangement of the buildings will be to get rid of the stairs leading to the Salles d'Attente, which are such an inconvenience to passengers for Normandy, Brittany, and England.

The works for the new Bourse du Commerce, delayed for a long time by difficulties in regard to existing rights on the site, are now being actually pushed forward. The plans having been long completed, there is nothing more to wait for. The principal front facing the Rue du Louvre will have a pediment adorned with the arms of the city; above this will be a group of sculpture symbolising Commerce and Industry; on the ground-floor will be the police offices and the postal and telegraph offices. On the first and second floor will be 250 offices intended for general business, and having intercommunication by wrought-iron galleries. As the new Bourse

occupies the site of the old Halle au Blé, it is hoped that the architect, M. Blondel, will take steps, in conjunction with the Municipal Administration, to save the fountain called "De la Halle au Blé," near that edifice, which is the last remnant of the Hôtel de Soisson demolished in 1748, and was designed by Jean Bullant for Catharine de Medicis.

At the Exhibition works, the foundations of the Palais des Beaux-Arts and that for the "Arts Libéraux" are in preparation. These two edifices, which are similar in plan and arrangement, will each have a grand central nave surrounded by a gallery, and each will have a dome 55 mètres in height. Between these two buildings is to be formed the central garden on the Champ de Mars, in the middle of which will be a monumental fountain with three basins one over the other, surmounted by a statue of France standing on the prow of a ship and holding in her right hand a torch which at night will be lighted by electricity. Beside her will be figures representing Science, Art, Industry, and Agriculture; at her feet, seated amid reeds, will be a figure representing the Seine, while Triton and Nereid figures disposed along the lower basin will represent the principal rivers of France. The piers of the Eiffel Tower have risen to a height of 15 mètres, and we are officially assured that it is to attain to 30 mètres by the 1st of January, and that it will be completely finished before the end of 1888.

In connexion with the Exhibition, definite arrangements have been officially made in regard to the work of the committees whose business it will be to organise the lectures on literature, art, history, archæology, science, political economy, sanitation, public works; in short, upon everything that can be made the subject of a lecture, during the progress of the Exhibition. In the section of fine arts, the organisation of these lectures will be entrusted to MM. Bailly, Bonnat, Chaplain, Claretie, Massenet, Louis Gonse, Gounod, Eug. Guillaume, and Meissonnier. In the section of history and archæology, the managers will be MM. Gaston Boissier, Duruy, Fustel de Coulanges, Maspéro, Georges Perrot, Rambaud, Reinach, and Albert Sorel. The choice is an excellent one, and a set of lectures on these subjects, under the organisation of such a committee, will probably have a real value for learned visitors. An attraction of a different kind is to be furnished by two well-known artists, M. Alfred Stevens and M. Gervex, who have obtained authorisation from the Government to instal, on a part of the Tuileries site, an immense panoramic decoration, the cartoons for which are already finished, and which will consist of a kind of illustration of the period from 1789 to the present day, including portraits of more than 1,800 persons celebrated in politics, art, science, the army, &c.

Contrary to general expectation, it is the old Théâtre Lyrique, lately become the "Théâtre de Paris," which seems destined to receive the homeless company of the Opéra Comique, till the rebuilding of their own house. This theatre, which the Municipality seemed disposed to let to the State, rather than the Gaîté, is situated on the Place du Châtelet,—that is to say, a long way from the boulevards and from the fashionable quarter of Paris,—a circumstance not in favour of the success of the enterprise. Like the Du Châtelet Théâtre, which faces it, the Théâtre de Paris is the work of M. Davioud. It was inaugurated in 1862, burned in 1871 during the Commune, and rebuilt in 1872 by the same architect. The exterior façade is richly decorated in the style of the Italian Renaissance. The salle, which is decorated with paintings by M. Theodore Maillot, contains 1,600 seats,—a little less than the Opéra Comique; but its acoustic properties are excellent, and its means of egress are ample for public safety.

Now that the metropolitan railway seems, in spite of the vast petition movement organised in Paris in favour of it, to be adjourned to the Greek Kalends, public opinion is a good deal occupied about a scheme, not likely to be realised for a good many years to come, which would, however, exercise an immense influence on the commercial power of the capital. We refer to the maritime canal which the Engineer of the "Ponts et Chaussées" Department, M. Bouquet de la Grye, proposes to establish between Clichy and Rouen, for a total length of more than 185 kilomètres, and which, with a minimum depth of 6 mètres, would permit all the shipping which now stops at Rouen to come right up to Paris. The cost is estimated at 130,000,000 francs. The Municipality is greatly in favour of it, and, indeed, there is a large section among the deputies who are prepared to claim the condition of "urgency" from the Government for it.

The Conseil-Général of the Seine is about to vote also for work of considerable importance, to render navigable that portion of the Marne known as the *boucle de la Marne*. This will be a very useful improvement, the total cost of which will be about 1,400,000 francs. It will be of great service to the whole of the country to the east of Paris, and will also have the advantage, with a regular service of steamboats, of permitting tourists to visit the beautiful country traversed by this tributary of the Seine.

The ninth exhibition of the "Union Centrale des Arts Décoratifs," though not yet completely organised, is likely to prove of special interest, as it will be at once retrospective and international, thanks to the co-operation of the museum authorities of Berlin, Vienna, Brussels, Buda-Pesth, and South Kensington. The tasteful decoration of the nave of the Palais d'Industrie contrasts agreeably with the vulgarity of the industrial exhibitions which take place there annually. The pavilions for special exhibits, distributed among the trees of the garden, have a picturesque effect and great variety of construction, and the first-floor galleries, reserved for foreign exhibits and for those of the Union Centrale, are connected with the ground-floor by two staircases,—too grand for the occasion, perhaps, but the design and decorations of which are highly creditable to those who are responsible for them.

The death is announced of the painter, Eugène Médard, who has died from the effects of a painful malady, at the age of thirty-eight. He had studied successively under Léon Cogniet and with M. Gérôme, obtained a medal of the third class, 1879, and one of the second class in 1886. He made a speciality of battle pictures, and had exhibited in the *Salon* of 1886 a "Combat dans un Village," and the "Bataille de Buzenval," which was purchased by the State. These were his last exhibited works.

We may end with a piece of good news for archæologists.* The Château d'Anet, which is one of the architectural wonders of the Renaissance, is, it appears, to be rebuilt after the plans of Philibert Delorme. After the death of Diane de Poitiers, for whom Henry II. had it built in 1548, the château passed into the hands of different proprietors. At the Revolution it was confiscated, and sold in 1798 for 3,200,000 francs. Nothing of its past glory really remains save some ruins, a fine gateway, some sculptures by Jean Goujon, and the remains of a staircase. The ancient gateway of the interior court of the château has been rebuilt in the court of the École des Beaux-Arts.

* We leave the remark of our esteemed correspondent as an example of the different manner in which such a scheme may be regarded, and perhaps is generally regarded in France. In England, probably few of us would regard it as a matter of much archæological interest that some ruined building by Wren, for instance, was to be rebuilt from his drawings. It would never look like the work of Wren's day, and the interest would be, to the minds of most of us, of such a purely artificial character as hardly to be worth the money and trouble expended. —ED.

BUCKINGHAM PALACE AND THE QUEEN'S JUBILEE.

ON the 13th of July, 1837, her Majesty first entered into residence at Buckingham Palace. Ten years later, the St. James's Park front, 360 ft. in length, was added by Blore to the three sides of Nash's fabric. Sir Robert Peel had represented to the Government that the then existing accommodation proved inadequate to the requirements of an increasing royal family. So the eastern railings were set forward, and the Marble Arch, which cost 80,000*l.*, and had been modelled after that of Septimius Severus at Rome, was in 1851 removed to Cumberland Gate. Blore's estimate of 150,000*l.* for the new works included certain rearrangements in the northern and southern wings, new kitchens, &c. The southern ball-room was added afterwards. John Nash's palace was erected during the reign of George IV., and completed *temp.* his successor. It is said to have been never occupied by the Queen's immediate predecessor on the throne. The original Buckingham,—or, to speak more correctly, Buckinghamshire,—House was built in 1703, from the designs of Captain Wynde or Wynne, pupil and executor of Inigo Jones, and architect of Newcastle, or Powis, House, Lincoln's Inn-fields.

A print of 1819 in our possession corresponds with the description of the house given by Hatton. It was built of red brick, in three floors; and had two wings, of two floors and an attic story, with which it was connected by circular arcades. The principal elevation had nine windows to each course, with two ranges of four pilasters, of the Corinthian and Tuscan orders, the latter being above. The wings, serving for servants' lodgings and for the kitchen and laundry respectively, were, as also the arcades, fronted with pilasters of the Tuscan, Doric, and Ionic orders. This house, eulogised by De Foe in his "Journey through England," had been erected on the site of Arlington (*pris* Goring) House, the town residence of George and his son Charles (Goring), Earls of Norwich; which, in 1646, had been allotted to Speaker Lenthall. On September 21, 1674, it was, as Evelyn tells us, consumed by fire. Lord Arlington's property here passed to his daughter and heir, Isabella, Duchess of Grafton. She first let it to William, fourth earl and first duke of Devonshire, and subsequently sold it to the Duke of Buckinghamshire and Normanby.

Having its main entrance towards the south, Goring House stood over the south-eastern corner of the Mulberry Garden, which is at this date represented by part of the palace grounds, wherein a garden-party was lately given by the Queen. Emulating the example of Henri Quatre, whose enthusiasm had been fired by Oliver de Serres's work, 1599, upon silk-worm rearing, James I. issued a circular to all provincial authorities, requiring them to provide for the planting of mulberry trees in various parts of the realm. To such encouragement of home manufacture of silk the king was further moved by a desire "to wean his people from idleness and the enormities thereof." * He set about this project, on his own account, by walling in rather more than four acres of St. James's Park, close by the course of the Tyburn. Charge of the plantation, together with a sum of 950*l.*, and an annual subsidy of 120*l.* for expenses, was committed to William Stallenge, Comptroller of Customs, and a successful rearer of silkworms in a venture of his own. In 1629, Lord Ashton was appointed Keeper. He sold his office for 406*l.* to George Goring, and with it, apparently, the site of Goring House. At the sale of Crown lands during the Civil War the garden was bought by Anthony Dean, of St. Martin-in-the-Fields parish, a prosperous shipwright at Harwich and Woolwich. Dean sold his lot to one Chipp, who retained it throughout the Commonwealth. It was during Chipp's possession that the Mulberry Garden was resorted to by pleasure-seekers whom Cromwell had ousted from Spring Garden. Henceforth, by name of Colby's Mulberry Garden, it became for a while the most favourite haunt of the kind in town. Its vast popularity, coupled with the perhaps not always perfectly correct deportment of the visitors, is fully vindicated by the comedies and other light literature of the period. Here Sir Charles Sedley found name and inspiration for the comedy he dedicated to one of the garden's chiefest votaries,—*la belle* Stewart; and hither came many a prototype of Shadwell's Mesdames Striker and Friske. Evelyn has sighed for us at the ladies' addiction to rouge; so, leaving Pepys to enjoy the *olla podrida* prepared for his party by my lord of Sandwich's cook, and Dryden to Mistress Anne Reeve's good company, we will turn to some matters that are less familiarly known.

In the year 1666, Lord Arlington† had taken Goring House. He dates hence, on June 1, 1672, an interesting account of the engagement in Southwold Bay (28 May). At the death of Charles Goring without male issue in 1670, the gardens were demised at a yearly rent of 1*l.* to Lord Arlington. Within a year or so they ceased to be visited by the public. By a conveyance dated November 22, 1681, he buys the site of his house and the adjoining grounds from Sir Thomas Grosvenor, Bart., for 3,500*l.* Westwards thereof lay an orchard and kitchen-garden that had been in tenure by the rich Hugh Audley. In 1689, Arlington House was

* Circular to Sheriffs, Deputy-Lieutenants, &c., Harl. MSS. 703.

† Edward (Bennet), Baron Arlington, 1663; advanced Viscount Thetford and Earl of Arlington 1672.

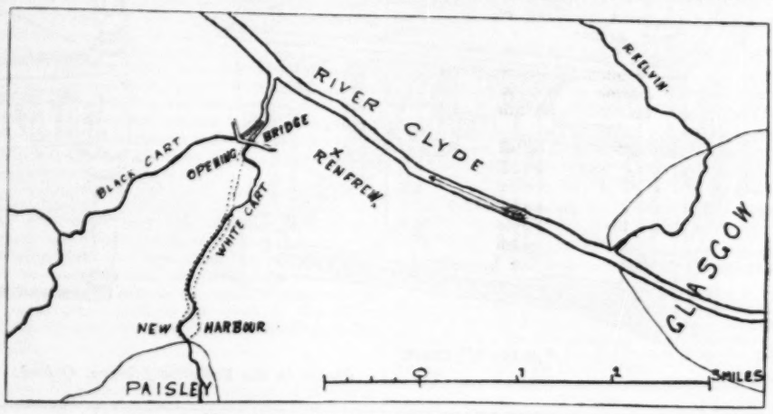
bought from the Duchess of Grafton by John (Sheffield) Duke of the County of Buckingham. In his plans for rebuilding, he largely consulted the convenience and comfort of his beloved and third wife, Katharine Darnley, widow to James (Annesley), third Earl of Anglesey, and daughter of Katharine Sedley by King James II. The Duke died on February 24, 1721; his widow, who set great store by her royal descent, on April 8, 1743. Their only surviving son Edmond, died at Florence, October 30, 1735, devising to his mother all his Yorkshire estates. They were inherited by her grandson Constantine Phipps, first Lord Mulgrave. This Constantine was son to Lady Katharine Annesley, a daughter of the Duchess by her former marriage, by her union with William Phipps in 1718. Constantine Phipps, elevated Baron Mulgrave, September 3, 1767, had married (1743) Molly, eldest daughter of John Lord Hervey,—"Youth's youngest daughter, sweet Lepel."

We are thus brought to an important, and we believe novel, chapter in the history of Buckingham House. By an indenture of June 1, 1741, the Duchess conveys it in trust to Thomas Salkeld, Zachary Chambers, and George Stringer. This indenture recites, by the way, that by letters patent of September 28th, 24 Charles II., the king had let, for ninety-nine years, running from St. John the Baptist's day, all that piece of land called the Mulberry Garden in the parish of St. Martin-in-the-Fields. Reserving her own life benefit therein, she assigns the property upon such trusts as she shall by deed or will determine. By a deed poll of even date with the indenture she appoints it in trust for Lord Hervey's benefit; and in the event of his not, within six months of her decease, formally signifying acceptance of the limitation, she appoints it to her executors for four years from her death, on trust, in favour of such persons as she should direct. After the said four years, and after Lord Hervey's death, in case he should accept such limitation, the lease and premises were to go for default to her residuary legatee, in trust; and for default, then in trust to the person ultimately entitled to her personal estate. By her will, dated February 15, 1742, the Duchess devises all her personal estate to Constantine Phipps, and bequeaths her leasehold estates in Yorkshire in trust to him and his heirs. It is commonly stated that Hervey did not care to take possession. This statement hardly coincides with an "answer," sworn April 3, 1744, by Constantine for self and for his wife, then an infant, in certain Chancery proceedings (Sheffield *v.* Earl of Orrery) instituted against them and the executors of the Duchess's will to obtain possession of the house. The answer clearly sets forth that very soon after her death Lord Hervey did take possession thereof, and continued in possession until his death on August 5, 1743. The Sheffield of the suit is Charles Herbert, to whom, being then "under the tuition of Mons. Brézy, at Utrecht," the Duke, by his will of August 9, 1716, left the house, failing lawful issue. Herbert, a natural son of the Duke, took the name of Sheffield, in terms of clause 11 of his father's will. Lord Hardwicke's decision of December 4, 1745, was in his favour on all points. He was created a baronet on the 1st of March, 1756. In the Suffolk Papers may be read a letter (August 1, 1723) to Mrs. Howard, wherein the Duchess rehearses the terms in which she is disposed to part with the house to the then Prince and Princess of Wales. The negotiations fell through, but in 1761 the house was bought for 21,000*l.* of Sir Charles Sheffield, and settled upon Queen Charlotte, by the name of "The Queen's House," in lieu of Somerset (or Denmark) House, in the Strand.

We may add that the effigy of "*La Belle* Stewart" (Duchess of Richmond), made by a Mrs. Goldsmith, together with those of the Duchess of Buckinghamshire and her son, are still preserved amongst the "wax figures" at West Minster. The bodies of the two latter rest in the Duke's tomb in Henry VII.'s Chapel. Pope's epitaph for the Duchess was never inscribed on the monument; that by the Duke for himself is a memorable composition, and has occasioned a considerable amount of theological discussion. The lines are altered somewhat from their wording as originally composed. In Clause 13 of his will they stood as follows:—"Pro rege sæpe, pro republica semper." "Dubius, sed non improbus vixi / Incertus morior, sed inturbatus / Humanum est nescire & errare / Christum adveneror, Deo confido / Omnipotenti benevolentissimo / Ens entium miserere mei /."

RIVER CART NAVIGATION WORKS.

THIS undertaking, for which an Act was got last year and the contract operations of which are now in active progress, furnishes a practical and convenient example of that canal-making for inland ship navigation purposes which has of late been engaging so much attention all over the world. A work, comparatively speaking, of very moderate compass longitudinally, it is yet essentially typical in its conditions and aims, and may indeed in some sort be called the Mersey and Manchester scheme on a greatly reduced scale, and with certain differences in principle, of course. The Cart,—or, to be more precise, the "White Cart,"—falls into the Clyde near Renfrew, six miles below Glasgow, after having passed the town of Paisley three miles inland, and subsequently received the Black Cart as a tributary. The latter branch is not navigable in any practical sense. Over these three miles below Paisley the course of the White Cart is through an alluvial deposit of low general elevation and very nearly flat, the channel itself being tidal as high as the town. In spring tides and during floods the Cart in this its lower section has always been navigable in a kind of way for very small craft, even back to remote times. The inhabitants of Paisley, which is a place of some antiquity, long ago recognised the possibilities of their river, and in 1786 they actually set to work on the original channel, and in a rough and ready way deepened it to about 7 feet ordinary spring tides. Some further trifling repair work was done in 1836: and in 1853, agitation again coming to a head, estimates were taken for works to provide a uniform high-water depth of 12 ft. But nothing was done. Two years ago this perennial speculation on the lasting good to be derived from a purposeful enlargement of the river's course once more assumed the acute stage, and so much enthusiasm was aroused that nothing short of a scope of work which would give access to ocean-going ships, and equip the town for setting up as a kind of humble rival to Glasgow, could now satisfy the revived enterprise of the magistrates and merchants of Paisley. The necessary Act was promptly procured, and six months ago ground was broken. Paisley is a populous town of swift and steady growth, with a large and increasing share of many varied industries. It has even cultivated the building of steamers (small ones necessarily) on the banks of its puddle of a stream; and if once made a seaport *de facto*, it is expected that vessels of almost the highest class will be built on the newly-made banks, while, at the same time, the town will figure as an independent emporium, in direct touch with all the great ports of the world. If the Paisley experiment succeeds, many towns of similar geographical position and promise will no doubt be found likewise engaged in operations for bringing the neighbouring deep-sea tide to their own doors. The channel of the Cart has hitherto been less than 90 ft. wide on the surface, with variable depth, and a liability to shoal at points; the banks unkempt, destitute of trees, and presenting, particularly at times of fallen tide, an aspect the most unlovely it is possible to conceive. One fortunate feature, however, in view of an adaptation to ship-canal purposes consisted in the absence of important crossings, the requirements of one bridge only, and that an opening bridge, having to be met all the way from Paisley to the Clyde outlet. With the exception of a new cut to clear an awkward bend of the original course, the works keep to the line of the river, which otherwise is a fairly straight one. Part of the requisite widening elsewhere is got by shaving away the left or west bank, but in following the natural trend of the stream much the larger portion comes off the other side. The finished result will be a channel with little of curve in it, 180 ft. wide at the surface, and possessing a centre depth of 18 ft. at high water. A towing-path, 20 ft. wide, will follow the right margin of the work from the Clyde outfall up to the new Paisley Harbour, the site for which has been chosen at a point which just stops short of the houses of the town. This harbour, a rough oval in shape, is formed by exaggerating the nominal breadth of the channel to a maximum width of 340 ft. at the widest section, and it is flanked on the west side by 820 ft. of strong quay wall, and on the east by 1,100 ft. of the same. Operations under the contract will terminate immediately above the new harbour in a sunken weir, preserving the upper and untouched portions of the stream *in statu quo*. Borings over the course of the river show that the materials to be got rid of by excavation, dredging, and blasting, consist largely of sand and gravel, with some boulder clay; also a good deal of sandstone rock in the upper reach. The quay walls of the harbour are faced with a 24 ft. height of granolithic blocks, springing from a concrete base, 2 ft. thick, the interior consisting of concrete rubble. No locks of any kind enter into the plan of the works, and in this highly-important respect the new harbour of Paisley will offer an access from the ocean quite as unimpeded as that afforded by the older neighbouring harbour of Glasgow. Operations have been in progress since the beginning of the year, and the contractors have already made conspicuous mark on that portion of the removable strata situated above low-water line. It is expected that full completion will be reached by the autumn of 1889. Messrs. Miller & Bell, Glasgow, are the engineers; Mr. John Kyle, resident works engineer; and the contractors are Messrs. Mitchell & Ireland.

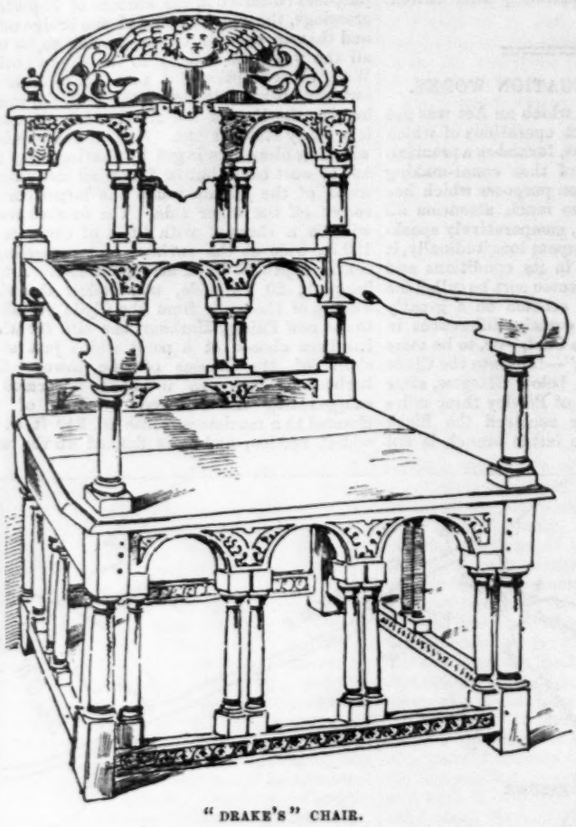


Map showing Bearings of Paisley Ship Canal.

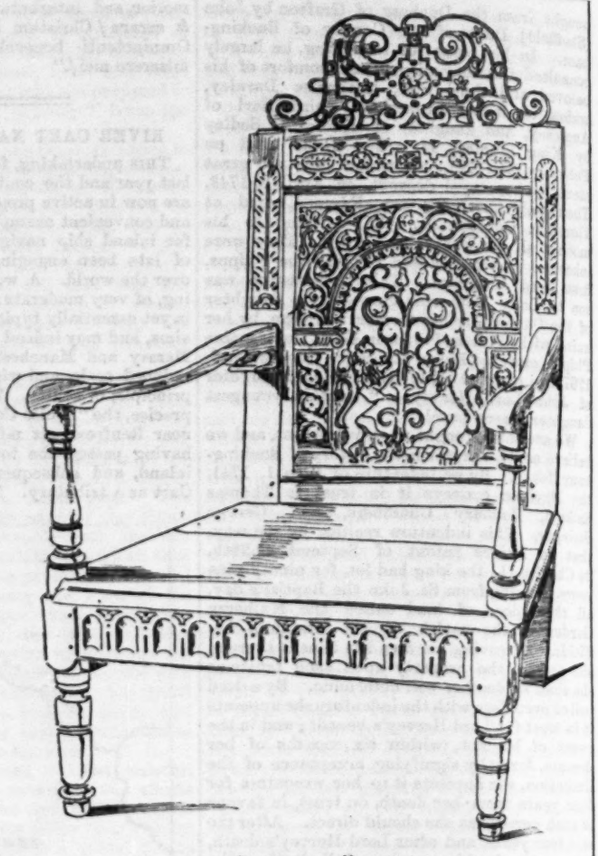
The Pharmaceutical Society's New Building in Bloomsbury-square, for the Pharmaceutical Society of Great Britain (Messrs. Lansdowne & Harris, architects), is now rapidly drawing towards completion. With regard to the sanitary arrangements and the ventilation, Messrs. Robert Boyle & Son's system is being applied throughout. Boyle's patent heating tubes are also used for warming the fresh-air supply to the large Examination Hall.

Civil and Mechanical Engineers' Society.—We are asked to mention that the offices of this society have been removed to No. 6, Queen Anne's-gate, Westminster, and that in future the meetings will be held at that address.

Royal Victoria Hall and Coffee Tavern.—The above hall, formerly the Victoria Theatre, Waterloo-road, has been closed during the last three months for thorough re-decoration and renovation, and has now been opened.



"DRAKE'S" CHAIR.



THE "FORTESCUE" CHAIR.

Chairs in the Bodleian Library, Oxford.

TWO CHAIRS FROM THE BODLEIAN LIBRARY.

THE two chairs here given are in what is known as the "Picture Gallery" in the Bodleian Library.

The earlier of the two is a fine specimen of carved work, and is called the "Fortescue" chair, and "probably formed a part of the furniture of 'Saldon House,' Mursley, Bucks, the seat of Sir John Fortescue, the friend of Sir Thomas Bodley, and the Chancellor of the Exchequer in the time of Queen Elizabeth" (*vide* card attached to chair). The total height of the back from the seat is 2 ft. 8½ in., and 1 ft. 9½ in. in breadth. The seat itself increases to about 2 ft. in the front and is 1 ft. 3½ in. from the floor.

The second chair, or "Drake's," was made out of some of the wood from the ship which took Drake round the world. There is a curious inscription written on the brass shield in Latin on one side and English on the other. The latter runs as follows:—

"To this great ship which round the world has run,
And match'd in race the chariot of the sun,
This Pythagorean ship (for it may claim
Without presumption so deserved a name),
By knowledge once, and transformation now,
In her new shape this sacred port allow.
Drake and his ship could not have wish'd from Fate
An happier station or more blest estate,
For, lo! a seat of endless bliss is given
To her in Oxford, and to him in Heaven.

ABRAHAM COWLEY, 1662.

Sent to the University of Oxford by order of John Davis, Esq., the King's Commissioner at Deptford."

The total height of the chair is 3 ft. 10¾ in., the back being 1 ft. 8¾ in. in breadth, and the seat 1 ft. 11 in. in front between the arms, and 1 ft. 8½ in. in depth. The back leans back slightly, and realises to some extent the last line but one of the inscription, being very comfortable to sit in.

West Malling.—A stained-glass window, to commemorate Her Majesty's Jubilee, has recently been placed in Addington Church, West Malling, by the parishioners. The window is of two lights, and contains figures of SS. Alphege and Frances, surmounted by architectural canopies, and was designed and executed by Messrs. Warrington & Co., of Fitzroy-square.

OPENING OF THE ACTON DRAINAGE WORKS.

THESE works of sewage disposal, designed by Mr. William Nicholson Lailey, Surveyor to the Acton Local Board, were formally opened on Thursday in last week by Mr. William Roebuck, C.E., Chairman of the Board, in presence of a large company of gentlemen interested in the treatment of sewage.

Several months ago a detailed account was given in the *Builder* of some experiments in the treatment of sewage under the ferrous-carbon system, which is promoted by the International Sewage Purifying Company. The Acton Board has entered into a provisional agreement for seven years with this Company to treat the sewage of the parish at the new sewage works, occupying a site of five acres and a half in the vicinity of the town. It should be explained that Acton is at present allowed to use as a sewage outlet an old watercourse (Stamford Brook), which now forms a sewer of the Metropolitan system; but this privilege only extends to the sewage of houses built before a certain date; and the drainage scheme now constructed has only to deal with the sewage of houses erected after that specified date. None of these latter houses have been connected with the new system, but the work will now be gradually proceeded with. In order to demonstrate the method of the new process, described as the magnetic-ferrous-carbon system of treating sewage, the Stamford Brook was tapped and the sewage allowed to flow into the works. The surroundings of the works are so admirably laid out with well-stocked flower-beds and carefully-gravelled paths, and the buildings, which include a commodious house for the resident superintendent, are so compactly arranged and pleasant in appearance, that the visitor at the first approach can scarcely resist the impression that he is not within the precincts of some wealthily-endowed benevolent institution. Some of the substantial details of the works have already been given in the *Builder*, but it may be here mentioned that in most similar schemes there are two levels for the sewers,—a high and a low. The high level sewer conveys the sewage from the high land in the north and north-west and north-eastern districts of the parish; and the low-level sewer conveys the sewage from the South Acton district. The sewage is discharged into a channel extending along one side of the precipitating-tanks, of which there are five, three with a capacity each of 138,282 gallons, and two of 72,150 gallons. The low-level sewage is pumped into this channel from a well 36 ft. deep by means of two non-condensing engines, 35-horse-power, erected by Mr. James Watt (late Boulton & Watt), Soho Works, Birmingham. Running parallel with this sewage channel is a small narrow upper channel, which receives the chemicals from the mixing-room, and which, by means of a series of equidistant arms or spouts, delivers the chemicals, the compound sewage salt, and the ferrous-carbon in the form of a slurry or thickish black liquid into the lower channel at various stages of the progress of the sewage towards the precipitating-tanks. It was interesting to notice the crude sewage as it passed along this open channel rapidly undergoing chemical change. A great portion of the organic matter is here coagulated with the chemicals, carrying away all the matter in suspension, and the grosser portion of the company's solution still in the shape of ferrous iron. This coagulation is due to the presence of the compound salts, which consist of certain proportions of sulphate of alumina, sulphate of calcium, and sulphate of magnesia. After the coagulation takes place, then the ferrous salts come into play, defecating the organic matter in solution. The magnetic ferrous carbon impregnates the fluid portion of the sewage, preventing decomposition. The treated sewage is then allowed to stand in the tank about three hours. The mode in which sewage is here passed into the tank is worthy of observation. The experience of the Company has led them to the belief it is better that the coagulation once formed should not be broken up, and consequently the treated sewage is passed into the tank with as little agitation as possible. With that object in view, Mr. Lailey devised a shoot, the lower end resting on a flushing-platform, so that the sewage slips down it at an easy incline, inasmuch as the platform rises with the sewage in the tank. This shoot also prevents the incoming sewage from stirring up the sludge as soon as it is

formed, which sometimes happens when the sludge is allowed to fall freely into the tank. The purified effluent water is drawn from the tank by means of a floating suction, which draws the effluent from the surface without disturbing the sludge at the bottom of the tank. Though the precipitated effluent is of a reddish hue, due to the presence of iron, it would not, it is contended, be detrimental to any stream into which it may flow, but the company assert that, for the production of a bright pure effluent, filtering through their prepared beds is necessary. Accordingly, one of the small tanks has been converted into a filtering bed, composed of the following layers, — 4-in. agricultural drain-pipes, packed close together, with shingle filled in between them; 4 in. of pea gravel; 6 in. of sand; then a layer of 10 in., composed of 5 in. of magnetic spongy carbon and 5 in. of sand and gravel, thoroughly mixed together. Above this is a layer of sand 9 in. in thickness, and on the top of the filter is spread 1 in. of coarse magnetic spongy carbon. The liquid sludge is swept into a well, from which it is afterwards pumped into a rotary agitator capable of containing 11,000 gallons, for the purpose of a further mixture with the company's chemicals, and so ensuring the impossibility of putrefaction taking place in the sludge after being pressed. Sludge has hitherto been made by the addition of ten to fifteen per cent. of lime, without which it would not press in the ordinary press. The company contend that by their chemicals they retain all the original manurial properties of the sludge which are driven off by the lime, which liberates the ammonia and renders the phosphoric acid insoluble, and, therefore, of no use for plant life. The pressing plant consists of two of Drake & Muirhead's (Maidstone) patent filter presses consisting of thirty chambers of 3 ft. internal diameter by 1¼ in. thick. The sludge is forced direct into the presses, without the employment of compressed air, by specially designed duplex steam pumping engines, which are automatic in their action. The cakes when pressed fall into wagons, which run on rails to the grinding-room, where they are ground into a powder, which is put into bags and sold as manure.

Mr. William Swaker ably superintended the carrying out of the whole of the details of these works.

The Lambeth New Workhouse Buildings.—An extensive block of new buildings is now in progress in Prince's-road, Lambeth, for the Guardians of the Parish of Lambeth. The buildings are being erected on the site of the old Workhouse, the greater portion of which has been taken down, and are chiefly intended as a test-house for able-bodied paupers, the guardians having decided that in future the present Workhouse off Lower Kennington-road shall in the main be appropriated to the aged and infirm. Including the eastern portion of the old building, which has not been removed, the structure will have a frontage to Prince's-road of about 300 ft. in length, and, being carried to a depth of 184 ft., will occupy a ground area of upwards of 55,000 ft. The Prince's-road frontage contains a deep basement and three floors, the blocks in the rear containing one floor only. On the ground floor of the block fronting Prince's-road are the inmates' day rooms,—six in number,—three for men on the west side, and also three for women on the east side, the master's offices being in the centre. All the upper floors will contain the dormitories. The one-story blocks at the rear will contain several workshops, oakum room, and hand-mill house on the male side; whilst on the female side is the laundry block. At the extreme rear in the centre is the inmates' dining-room, an apartment, 50 ft. by 30 ft.; a floor above this being appropriated for the chapel. The basement of the front block contains the male and female receiving wards and officers' rooms, and stores; and also a number of workshops. An open area in the centre, enclosed by the several blocks, contains six yards for the use of the male and female inmates, these yards being appropriated to the paupers, who are intended to be specially classified according to character and physique. Mr. T. W. Aldwinckle, of East India-avenue, E.C., is the architect; and Mr. W. Smith, of the Eldon Works, Harleyford-road, is the contractor. Mr. W. Chutter is clerk of the works. The estimated cost of the buildings is 20,000*l.*

THE INSTITUTION OF CIVIL ENGINEERS.

SUBJECTS FOR PAPERS.—SESSION 1887-88.

THE Council of the Institution of Civil Engineers invites original communications on the subjects included in the following list, as well as on any other questions of professional interest. For approved papers the Council has the power to award premiums, arising out of special funds bequeathed for the purpose, the particulars of which are as under:

1. The Telford Fund, left "in trust, the interest to be expended in annual premiums, under the direction of the Council." This bequest (with accumulations of dividends) produces 260*l.* annually.

2. The Manby Donation, of the value of about 10*l.* a year, given "to form a fund for an annual premium or premiums for papers read at the meetings."

3. The Miller Fund, bequeathed by the testator "for the purpose of forming a fund for providing premiums or prizes for the students of the said Institution, upon the principle of the 'Telford Fund.'" This fund (with accumulations of dividends) realises 150*l.* per annum. Out of this fund the Council has established a scholarship,—called "The Miller Scholarship of the Institution of Civil Engineers," and is prepared to award one such scholarship, not exceeding 40*l.* in value, each year, and tenable for three years.

4. The Howard Bequest, directed by the testator to be applied "for the purpose of presenting periodically a prize or medal to the author of a treatise on any of the uses or properties of iron, or to the inventor of some new and valuable process relating thereto, such author or inventor being a Member, Graduate, or Associate of the said Institution." The annual income amounts to nearly 16*l.* It has been arranged to award this prize every five years, commencing from 1877. The next award will therefore be made in 1892.

The Council will not make any award unless a communication of adequate merit is received, but will give more than one premium if there are several deserving memoirs on the same subject. In the adjudication of the premiums, no distinction will be made between essays received from members of the Institution or strangers, whether natives or foreigners, except in the cases of the Miller and the Howard bequests, which are limited by the donors.

List.

1. The Utilisation of Unused Sources of Power in Nature,—such as the Tides, the Radiant Heat of the Sun, &c.
2. Tacheometry, or Rapid Surveying.
3. The distinguishing qualities of Clay to make good Puddle.
4. Colonial Woods suitable for Engineering purposes.
5. The influence of Sea-Water upon Portland-Cement Mortar and Concrete.
6. The Wind-Pressure upon Structures, as influenced by (1) their superficial area; (2) the form or position of the exposed surfaces; (3) the shelter of adjacent bodies; and (4) the dynamic action of sudden gusts upon elastic structures.
7. The Working-Strength of Iron and Steel as affected by (1) the amplitude; (2) the frequency; and (3) the time-rate of the stress-variations.
8. Description of any new or peculiar form of Mountain Railways for very steep gradients.
9. Recent Irrigation-Works in California.
10. Machinery and Arrangements for Distilling Water by Multiple Effect.
11. The effect of different Qualities of Water on the condition and duration of Cast-iron Pipes.
12. On the Sale of Water by Measure.
13. Uniformity in system (international) of Coast-Lighting by lighthouses, light-vessels, and their auxiliaries, automatic lighted beacons and buoys.
14. Recent Improvements in Cable Tramways.
15. The Present Position of the Manufacture of Steel,—its defects, and suggestions for its improvement.
16. The action upon Basic Steel of (1) Chromium; (2) Aluminium; and (3) Tungsten.
17. The Use and Testing of Open-hearth Steel for Boiler-making.
18. The Production of Aluminium and its Alloys, with their Properties and Uses.
19. Manganese in its application to Metallurgy.
20. Improvements in Zinc-Smelting.
21. The Application of Steel Castings and of Steel Forgings to the Construction of Ordnance and of Projectiles.
22. Rapid-firing Guns.
23. On Forging by Hydraulic Pressure.
24. The most recent types of (1) Mail Steamers; (2) Cargo Steamers; and (3) War-ships.
25. On the Use of Liquid Fuel for Steam-Boilers and other Industrial purposes.
26. The Independent Testing of different types of Steam-Engines, including Triple-Expansion and Quadruple-Expansion Engines.
27. The Construction of the Working Parts of Steam-Engines, in relation to the high pressures and temperatures now becoming general.
28. The practical limit to the Working-Pressure of Steam in Marine Boilers.
29. Auxiliary Engines connected with the Modern Marine Engine.
30. On Speed Indicators for Locomotives.
31. The Construction and Efficiency of Steam-Turbines.
32. The Transmission of Steam underground in the United States, with the results obtained.
33. Hydraulic Pumps for Working at High Pressures.
34. The Relative Economy of various modes of distributing Power over large Areas.
35. Descriptions of Hydraulic Rams and of Turbines, with actual quantitative results.
36. The means of governing and economising high-pressure fluid in Hydraulic Cranes, Engines, &c.
37. Tools used in the Building of Iron and Steel Ships, and in the Construction of Boilers.
38. Type-Composing and Distributing Machines.
39. On Natural Gas, and its applications to the Industrial Arts.
40. Compressed Oil-Gas, and its applications.
41. On the Spontaneous Combustion of Coal in Ships.
42. Appliances for the rapid Shipment of Coals, with a comparison of different methods.
43. Electro-Motors: their theory, construction, efficiency, and power.
44. The Construction and Maintenance of Secondary Batteries.
45. The Distribution of Electricity for the Lighting of Towns.
46. The application of Electricity to the Working of Street Tramways.
47. The application of Electricity to Smelting and Metallurgical Operations.
48. Means of insuring the Safety of Blasts in Explosive Atmospheres.
49. Contributions to the Bibliography of special branches of Engineering.

PREMIUMS AWARDED, SESSION 1886-87.

The Council of the Institution of Civil Engineers has awarded the following premiums:—

The Howard Quinquennial Prize to John Percy, M.D., F.R.S., Hon. M.Inst.C.E., in recognition of his researches on the Uses and Properties of Iron.

For Papers Read and Discussed at the Ordinary Meetings.

1. A Telford Medal and a Telford Premium to Alexander Blackie William Kennedy, F.R.S., M.Inst.C.E., for his paper on "The Use and Equipment of Engineering Laboratories."
2. A Telford Medal and a Telford Premium to John Hopkinson, jun., M.A., D.Sc., F.R.S., M.Inst.C.E., for his paper on "The Electric Lighthouses of Macquarie and of Tino."
3. A Telford Medal and a Telford Premium to Colonel Hardley Maitland, R.A., C.B., Assoc.Inst.C.E., for his paper on "The Treatment of Gun-Steel."
4. A Telford Medal and a Telford Premium to William Willcocks, M.Inst.C.E., for his paper on "Irrigation in Lower Egypt."
5. A Watt Medal and a Telford Premium to Edward Arnott Clowes, for his paper on "Printing-Machinery."
6. A Telford Premium to William Joseph Dibdin, F.C.S., F.I.C., for his paper on "Sewage-Sludge and its Disposal."
7. A Telford Premium to William Santo Crimp,* Assoc.M.Inst.C.E., for his paper on "Filter-Presses for the Treatment of Sewage-Sludge."
8. A Telford Premium to John James Webster,† M.Inst.C.E., for his paper on "Dredging Operations and Appliances."
9. A Telford Premium to John Kyle, M.Inst.C.E., for his paper on "The Colombo Harbour Works, Ceylon."
10. The Manby Premium to Lewis Henry Ransome, Stud.Inst.C.E., for his paper on "The Conversion of Timber by Circular-saws and by Band-saws in the Pine-growing districts of the United States."

For Papers printed in the Proceedings without being Discussed.

1. A Telford Medal and a Telford Premium to John George Gamble,* M.A., M.Inst.C.E., for his paper on "Water Supply in the Cape Colony."
2. A Watt Medal and a Telford Premium to William Isaac Last, Wh.Sc., Assoc.M.Inst.C.E., for his paper on "Setting out the Curves of Wheel-Teeth."
3. A Telford Premium to Joseph Hetherington, for his paper "On Utilising Waste Air in Filter-Pressing; with some results of Pressing Sewage-Sludge at Chiswick."
4. A Telford Premium to Killingworth William Hedges, M.Inst.C.E., for his paper on "Central Station Electric Lighting."
5. A Telford Premium to Charles John Wood,* M.Inst.C.E., for his paper on "The Molteno Reservoir, Cape Town."
6. A Telford Premium to Alexander Leslie† F.R.S.E., M.Inst.C.E., for his paper on "Salmon-Ladders in Scotland."
7. A Telford Premium to David Alan Stevenson,‡ B.Sc., F.R.S.E., M.Inst.C.E., for his paper on "Ailsa Craig Lighthouse and Fog-Signals."

For Papers read at the Supplemental Meetings of Students.

1. The Miller Scholarship to John Goodman,§ Wh.Sc., Stud.Inst.C.E., for his paper on "Recent Researches in Friction." Part II.
2. A Miller Prize to Sidney Herbert Wells, Wh.Sc., Stud.Inst.C.E., for his paper on "The Propelling Machinery of Modern War-ships."
3. A Miller Prize to Robert Francis Hayward, Stud.Inst.C.E., and a Miller Prize to John Platt, Stud.Inst.C.E., for their joint paper, "Experiments on Iron and Steel in Tension, Torsion, and Shear."
4. A Miller Prize to Ernest William Moir,§ Stud.Inst.C.E., for his paper, "Hydraulic Appliances at the Forth Bridge Works."
5. A Miller Prize to Alfred John Hill, Wh.Sc., Stud.Inst.C.E., for his paper on "The Use of Cast-Steel in Locomotive Construction."
6. A Miller Prize to Alfred Chatterton, B.Sc., Stud.Inst.C.E., for his paper on "Flour Mills and their Machinery."
7. A Miller Prize to Edward Carstensen de Segundo,§ Stud.Inst.C.E., for his paper, "Experiments on Steam-engine Economy."

Scottish Building Grants.—In terms of a Parliamentary Return relating to the sums annually voted during the past ten years to the four Scottish Universities and to the Royal Observatory and Royal Botanic Garden, Edinburgh, the expenditure for new works, embracing the purchase of sites, includes the items following:—Aberdeen, 5,167*l.*; Edinburgh, four grants in aid of, 20,000*l.* each; St. Andrew's, 679*l.*; Observatory, 1,033*l.*; and the Botanic Garden, 2,381*l.* The last-named amount does not include certain expenditure upon Inverleith House and the Edinburgh Arboretum.

* Has previously received a Telford Premium.
† Has previously received a Telford Medal and a Telford Premium.
‡ Has previously received a Manby Premium.
§ Has previously received a Miller Prize.

"Charity": Design for Stained Glass. Small Reproduction from Working Drawing to show Arrangement of the Constructional Bars.

Illustrations.

"CHARITY."

CARTOON FOR STAINED GLASS WINDOW.

THE unusual form of this window demanded a somewhat unusual character of design.

Given a window with a clear space of nearly 14 ft. high, over 9 ft. wide, and a single subject to fill it, a more or less pictorial treatment seemed desirable, subject to constructional considerations.

The space required not less than two upright bars, and, as an important centre figure was essential to the theme, it was necessary to avoid a centre upright.

These being the conditions, a design was adopted in which the architectural features were calculated to supply the place of the usual mullions, the upright bars being employed to emphasise the most important upright architectural lines, many of the horizontal bars answering a corresponding purpose. (See the accompanying small illustration from the working drawing.)

The composition divides itself mainly into three groups, one or two figures only crossing the upright bars so as to connect the parts into one subject.

The curtain behind the portico is deep blue, upon which the centre figure is relieved in draperies of varied rubies. Otherwise the colours are nearly confined to the draperies, which, for the most part, stand either in close relation with each other, or directly on the greenish and greyish whites of the architecture.

The allegorical group which occupies the head of the window is treated as statuary in whites, like the architecture.

HENRY HOLIDAY.

JESUS COLLEGE, CAMBRIDGE.

THE view shows in the foreground the new buildings which have of late years been carried out, and in the distance the ancient parts of the College (which have been altered and restored), together with the block of chambers built in 1870 under Mr. Waterhouse. The chief object of the erection of the new buildings has been to increase the accommodation for undergraduates, a large number of them having been obliged to reside outside the College in default of a sufficient number of sets of rooms being available for them within it. It was also necessary under the revised statutes to provide residences for two married Fellows as disciplinary officers of the College, as well as tutors.

The general character of the buildings follows that of its founder, Alcock, Bishop of Ely, to whom Henry VII. granted the Charter of Foundation on June 12th, 1497, some two years after the site had been acquired and the buildings begun. There were then existing on the site the almost ruinous buildings of the decayed nunnery, which in A.D. 1133 had been founded and dedicated to St. Mary and St. Rhadegund. Mr. J. Willis Clark, in his valuable work "The Architectural History of the University of Cambridge," gives a very interesting account of the several buildings, both conventual and collegiate, together with many notes and sketches by the late Professor Willis. It will, therefore, suffice to say that the conventual plan has evidently much influenced that of the founder of the college.

Bishop Alcock restored the choir, tower, and transepts of the former conventual church, and used it as his College Chapel; after removing the two side chapels dedicated to St. Catherine and to St. Margaret some few years later (about 1510) the ruined nave was reconstructed at the expense of Sir John Roysley (Bishop Alcock died Oct. 1, 1500), partly as an ante-chapel and partly for residential purposes; and there have been found enclosed in these walls remains of the pillars and arches, and of other architectural features of the twelfth and thirteenth centuries, which were then standing in a state of ruin, thus preserving to our day the several steps of the architectural history of the church. The side aisles of the nave were, however, altogether removed, excepting some fragments in the present Master's Lodge, but by this means the area of the cloister court (on the north side of the church) was enlarged. The old refectory stood on the north side of the cloister court, and on its site Bishop Alcock built his college dining-hall. Thus we find the unique plan (for a college) of a cloistered quadrangle. This cloister is now modernised, but the drawing shows the ancient design of the windows (from Logan) as they are proposed one day to be restored. The buildings on the east and west sides of the cloister court (including the library) are Bishop Alcock's work, with additions and extensions of 1503 (Lady Catherine Bray), 1638, 1718, and 1822.

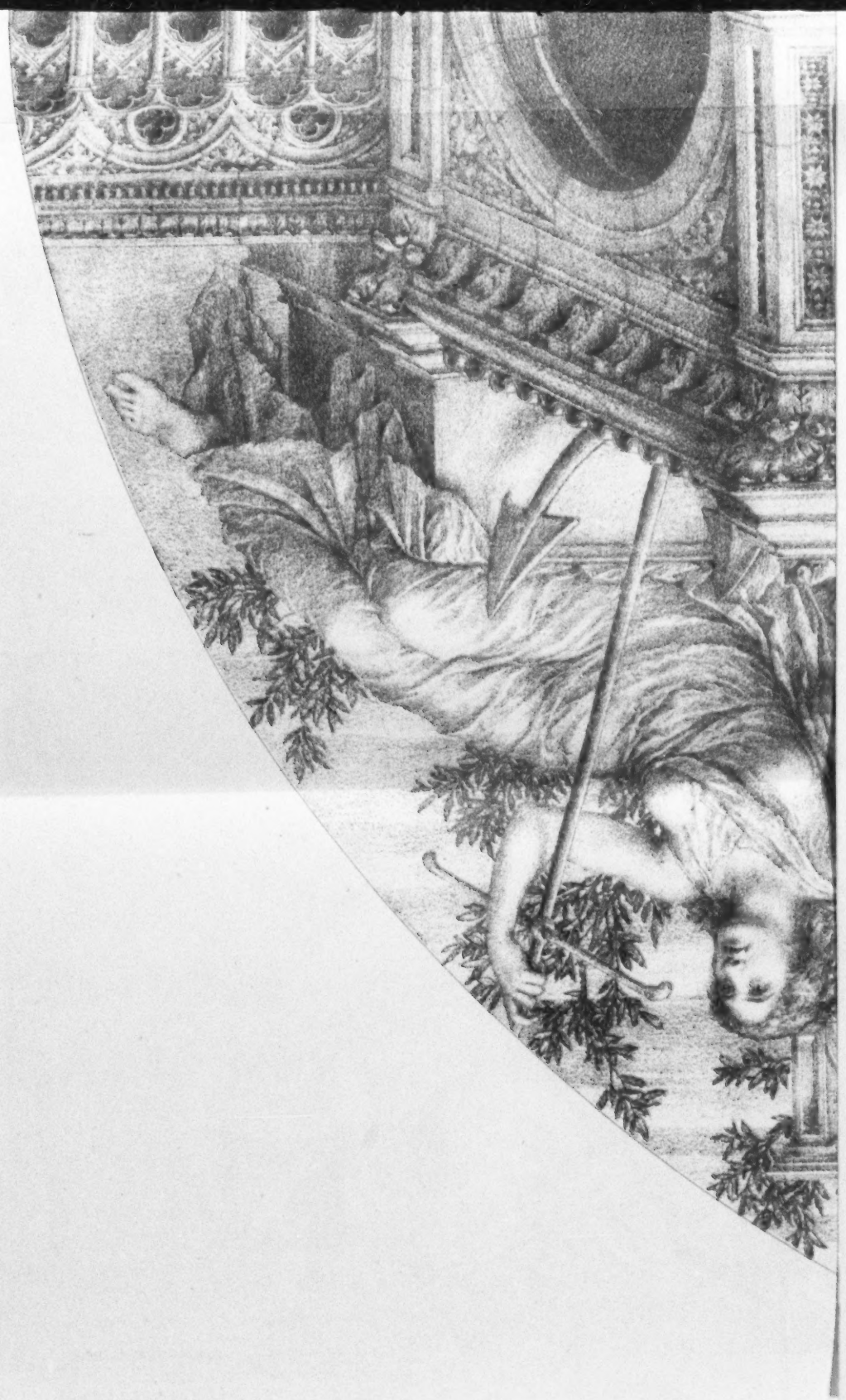
The chapel, it should be noted, was ably restored by Pugin, and the restorations have been continued under Messrs. Bodley & Garner, whose plans are now under consideration for the necessary alterations involved in the rearrangement of the fittings, by extending the choir, as in conventual days, across the tower into the nave, with screens across the transepts.

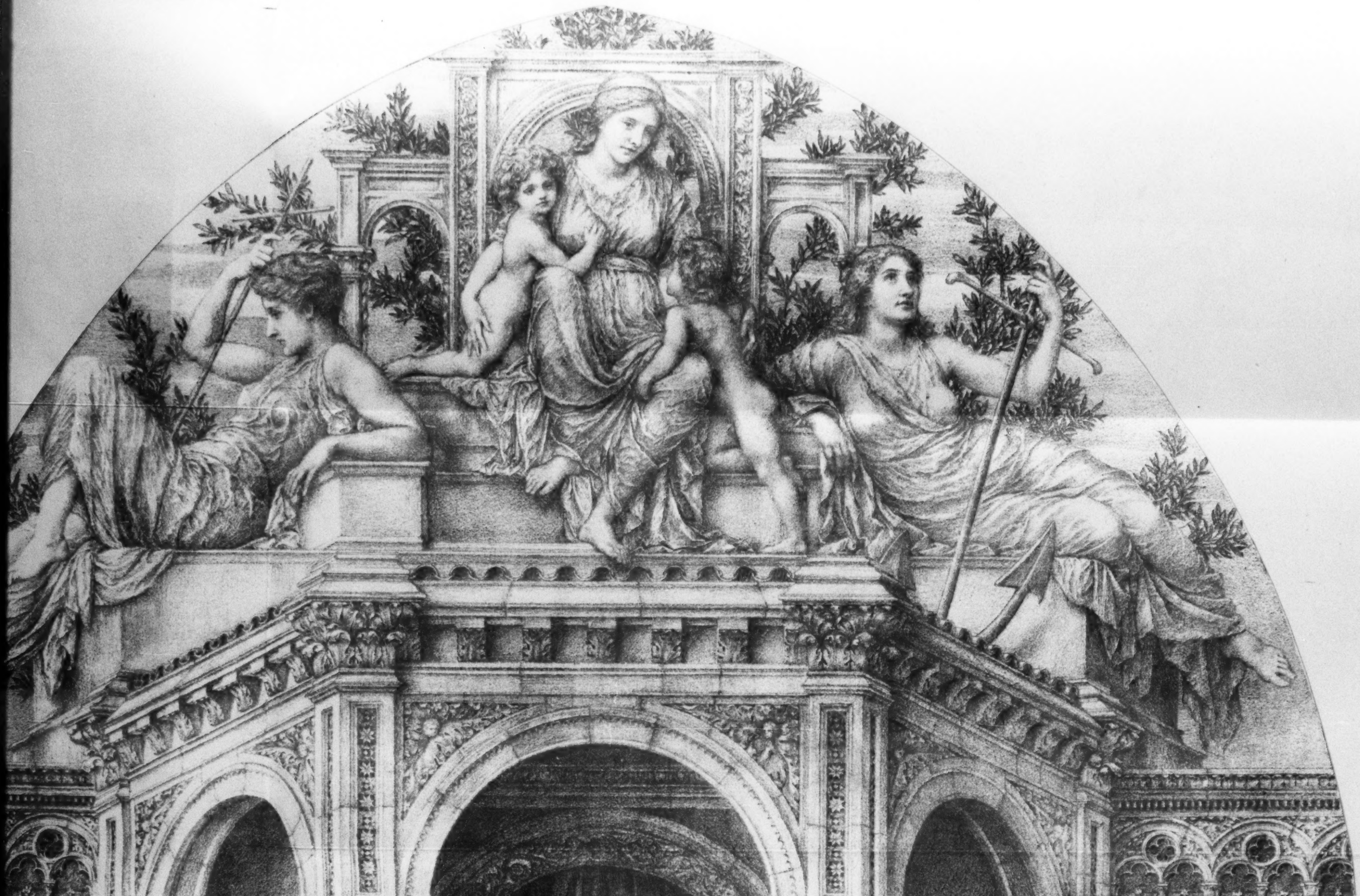
The newly-erected buildings are from the designs of Mr. R. Herbert Carpenter & Mr. Benj. Ingelow, who have also carried out the restoration of the old buildings forming the west side of the new court. The style and materials are both regulated so as to harmonise with Alcock's work, which had certain peculiarities of its own; as, for instance, the stepped parapets, which may be seen on his gate-tower and on the gables of the hall. The heads of his windows are, as a rule, without cusping, but there are some exceptions, as, for instance, in the oriel of the hall, and this was felt to be sufficient authority for so treating the window-heads of the new block, while the more general type of ancient window (of which some few are fortunately preserved) was adhered to in the old wing, in place of the square sashed openings which had usurped their places in all portions except those which were not generally visible! This treatment has also been carried out in the alterations of the Master's Lodge. The low, flat pitch of the roof is also a characteristic of the founder's work. He used for the walls a very poor quality of bricks, such as is now not to be obtained, and it was therefore decided to use for the new buildings the red Haverhill bricks with dressings of Ancaster stone.

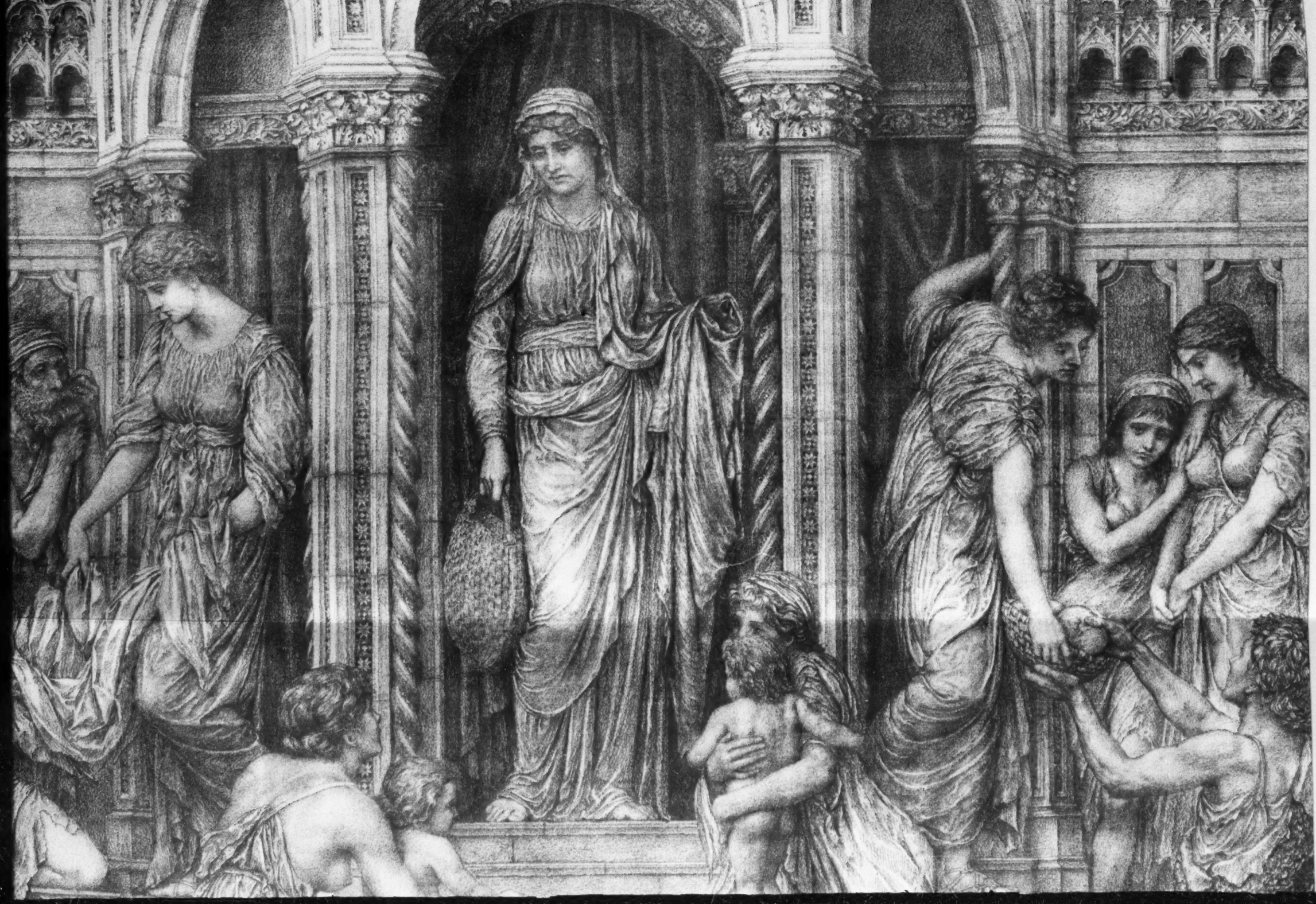
There are provided in the new block thirty-six sets of rooms for undergraduates, a lecture-room, servants' rooms, &c. The tutors' houses are treated in a more simple style with the same materials.

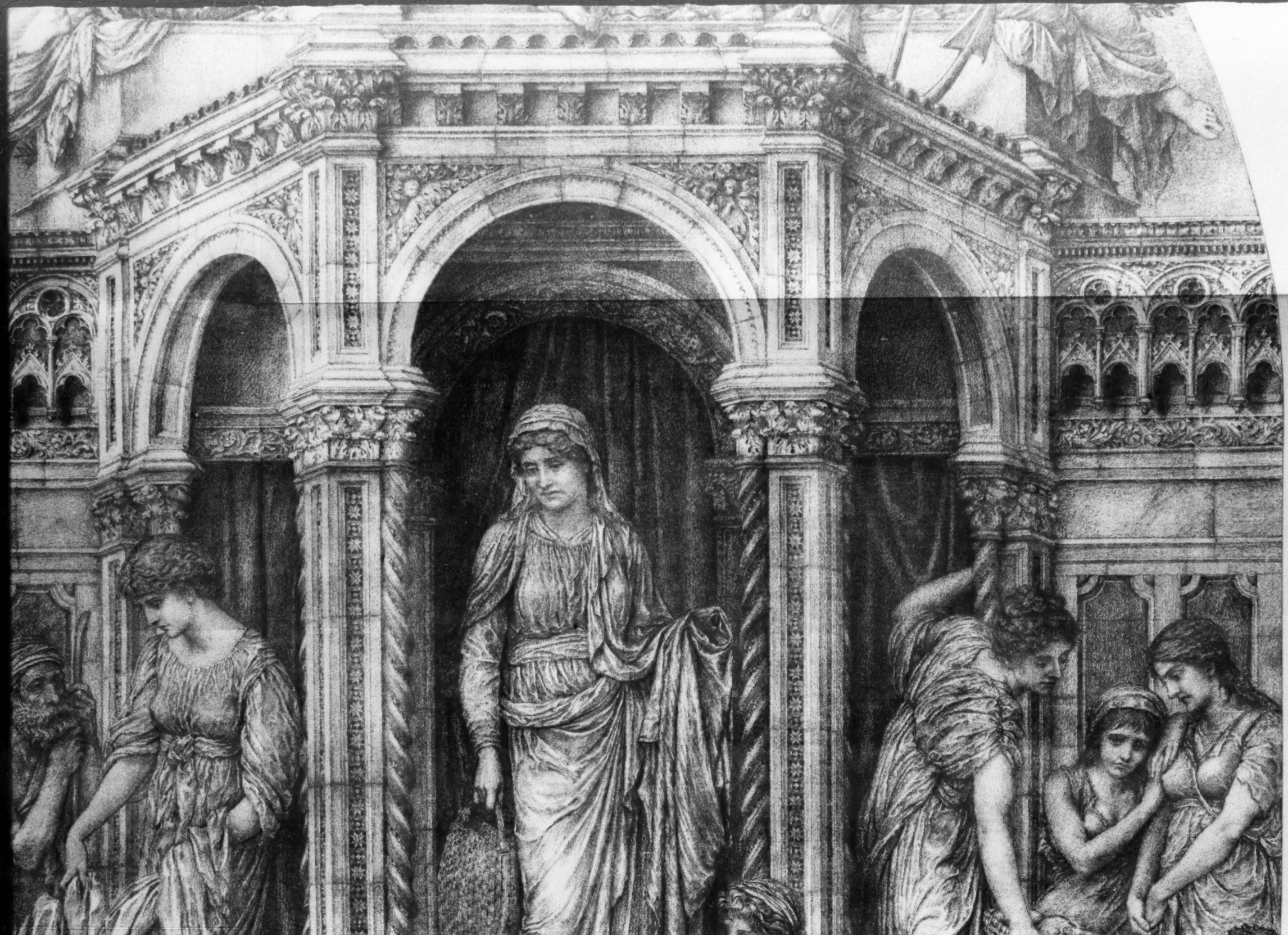
A new entrance-gateway has been formed in Jesus-lane, with a porter's lodge and inner gateway near to the court. This new court,—formerly a part of Jesus-close, has been laid out and planted, as well as the new gardens, under the directions of the Rev. E. H. Morgan, tutor and dean of the College (whose residence is in the foreground on the left of the picture).

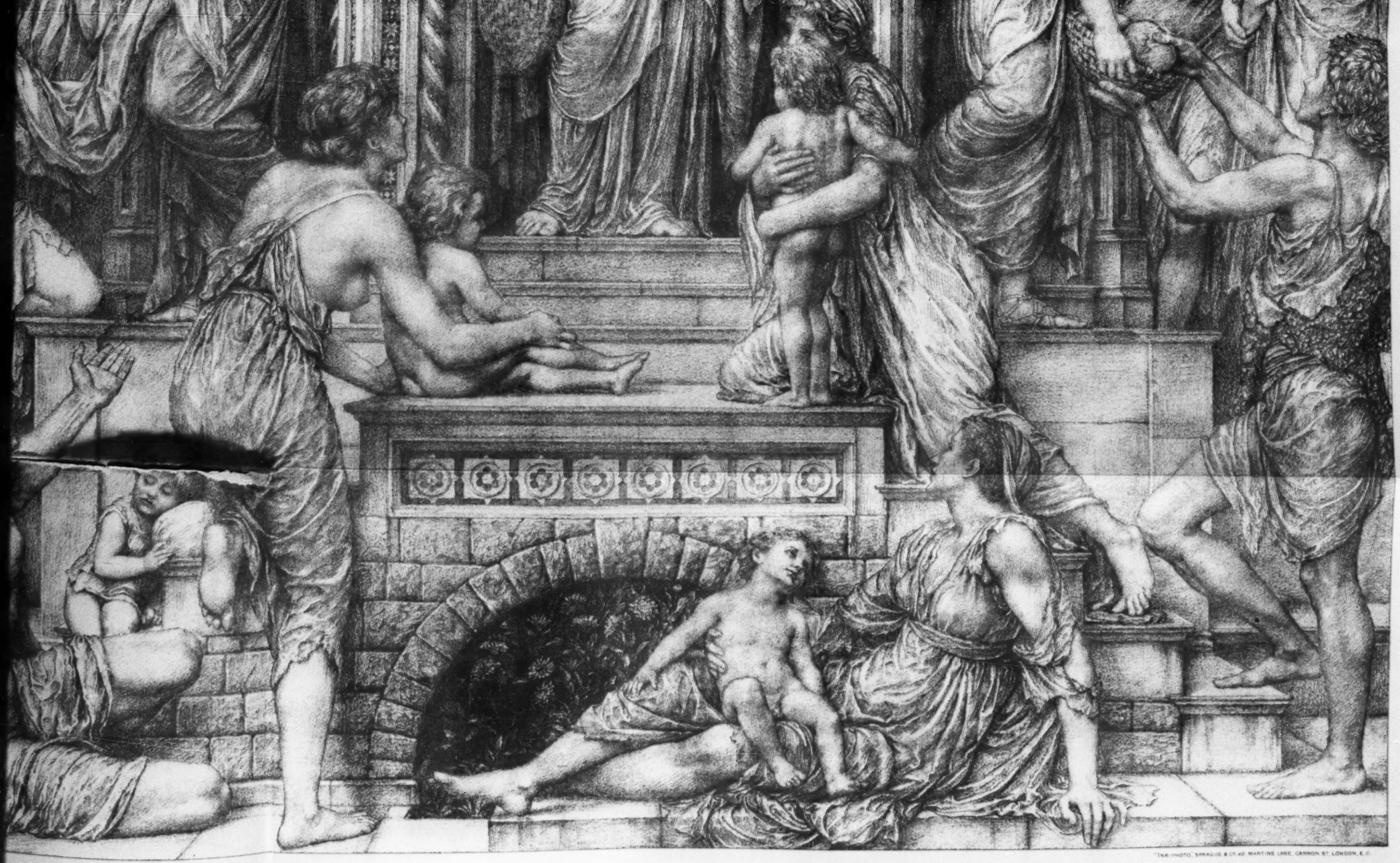
The College has a very large close on three sides, planted with magnificent old trees extending to the river Cam. At some time, if need be, the court will be completed by extending the





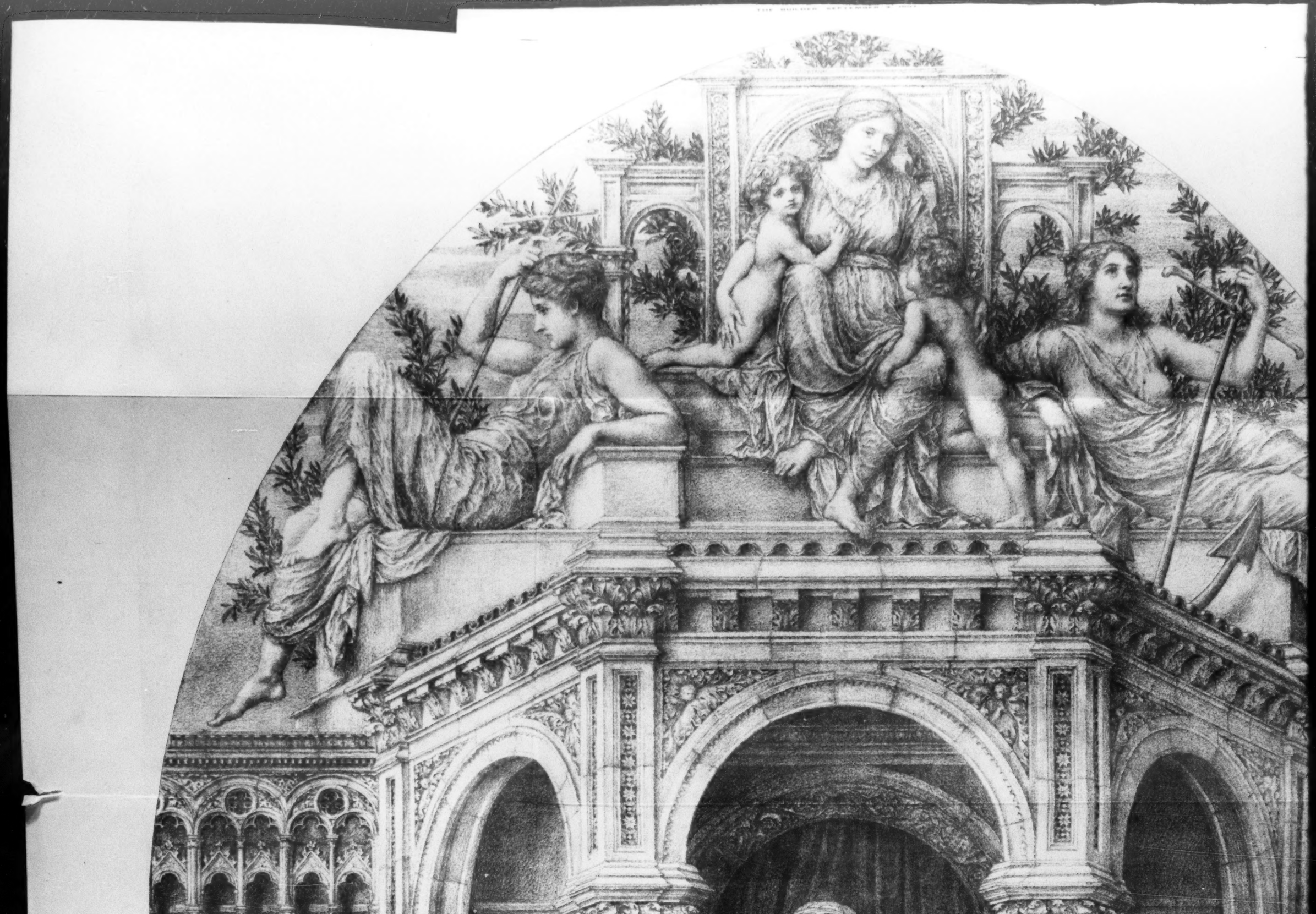


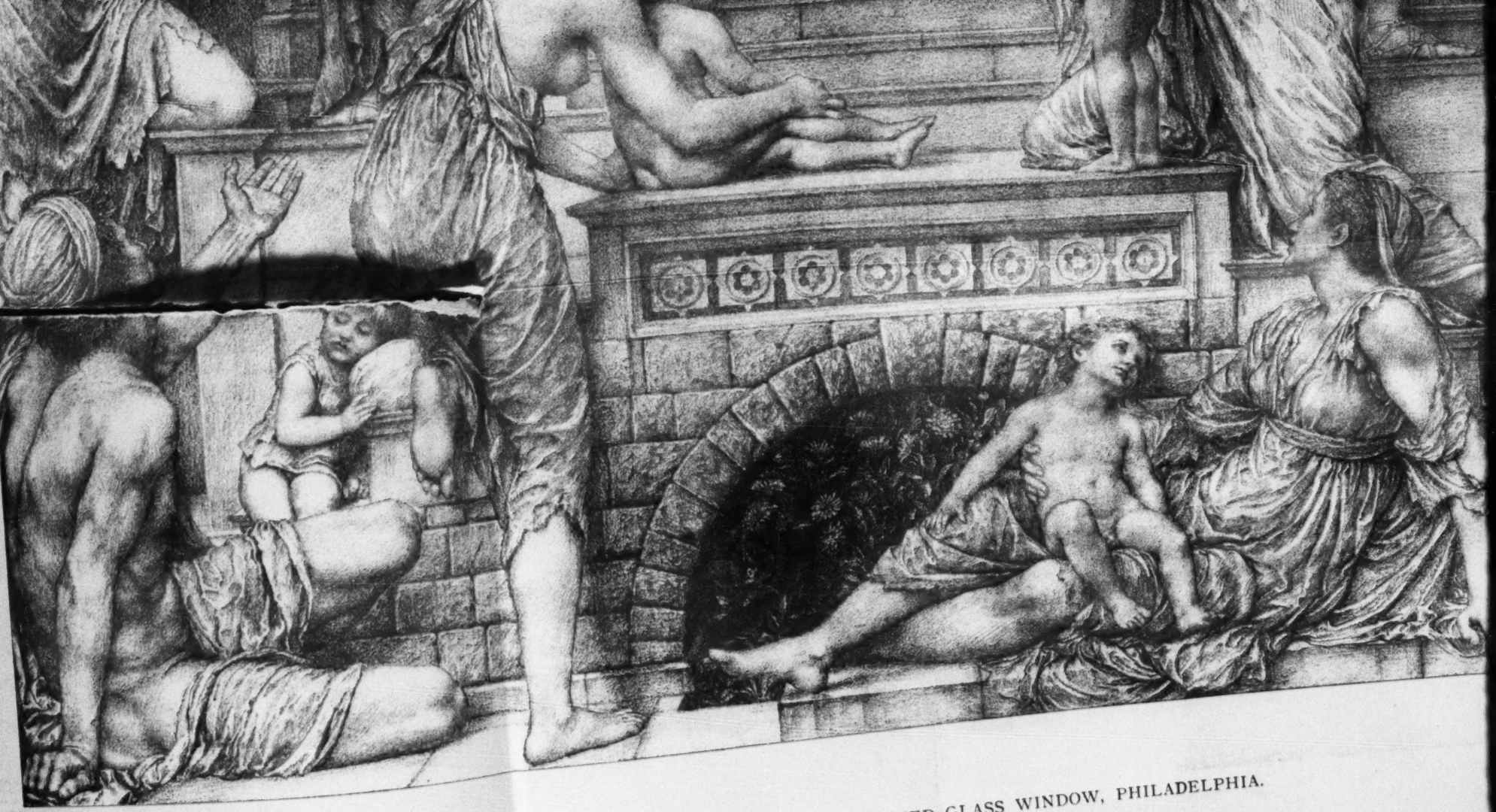




CHARITY. DESIGN FOR STAINED GLASS WINDOW, PHILADELPHIA.

BY MR. H. HOLIDAY.





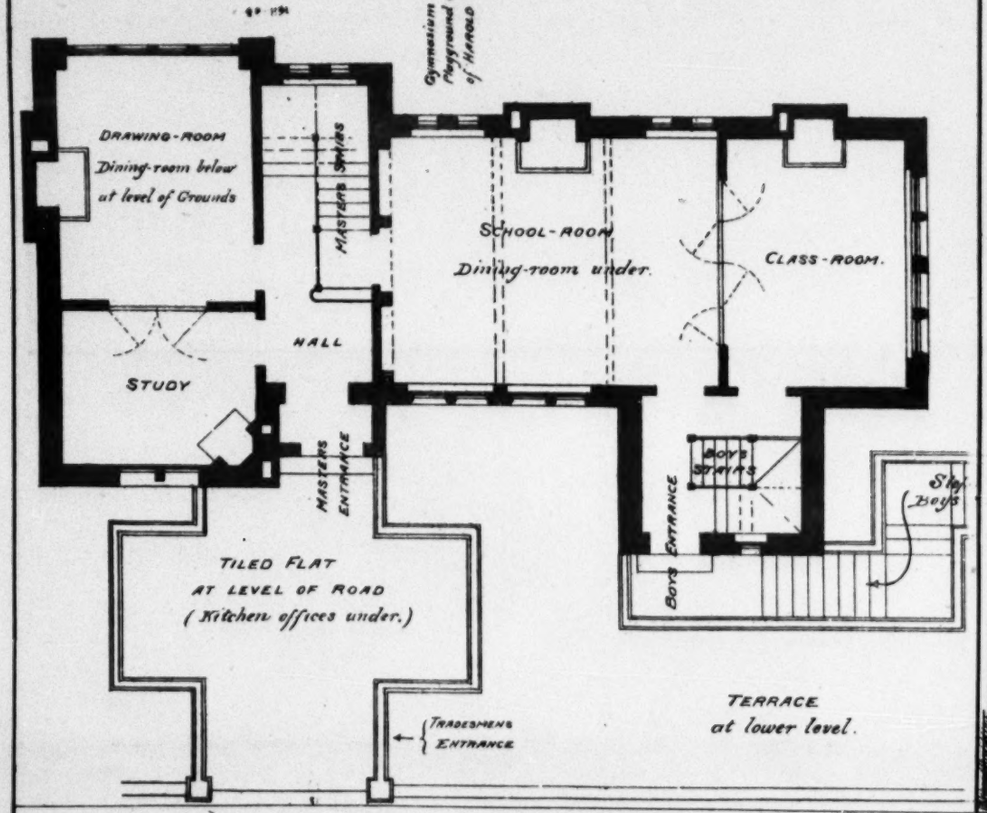
CHARITY: DESIGN FOR STAINED GLASS WINDOW, PHILADELPHIA.

BY MR. H. HOLIDAY.

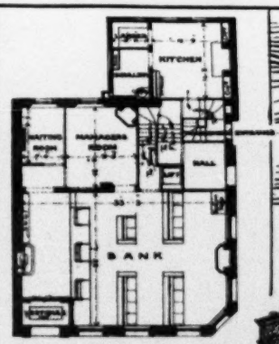
RESIDENCES AT TUNBRIDGE WELLS.—Mr. W. H. Oakley, Architect.

PREMISES IN THE HAYMARKET.—Mr. H. E. Goggins, F.R.I.B.A., Architect.

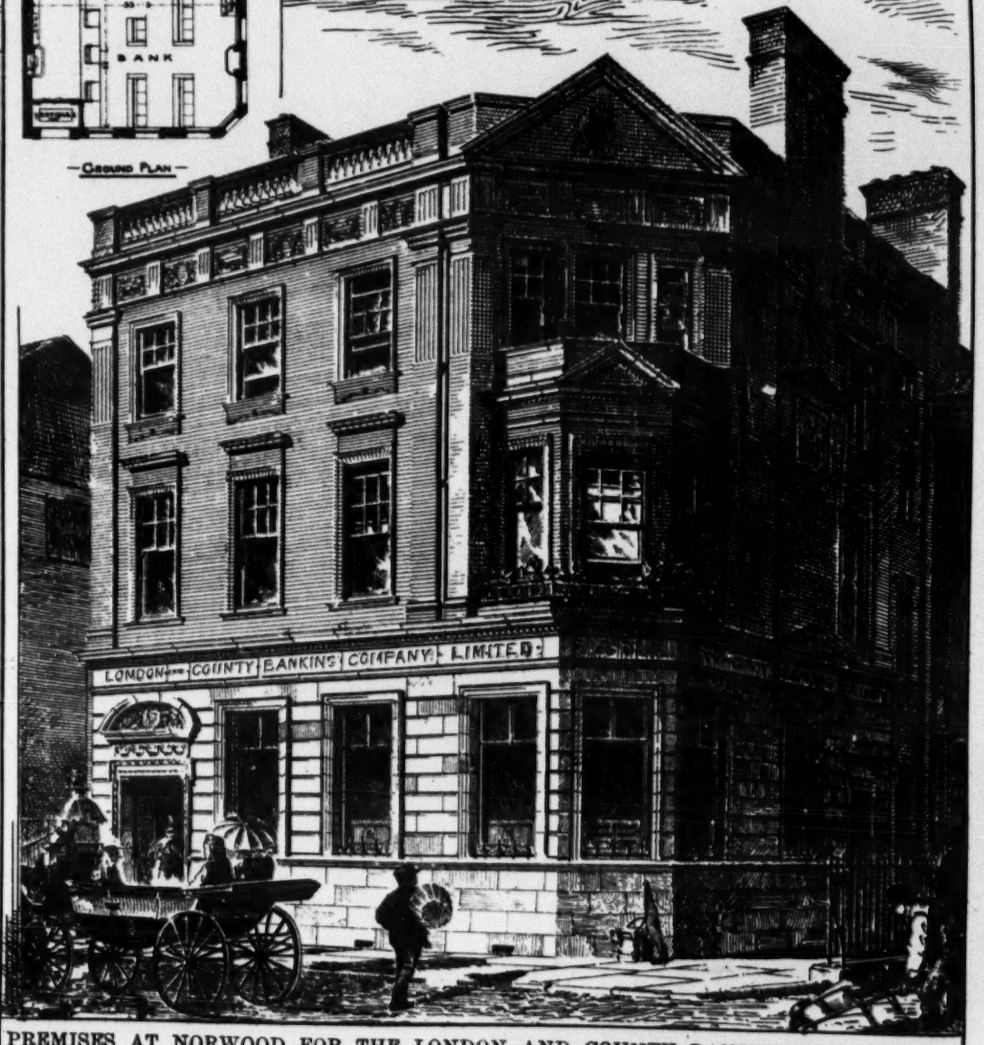
PREMISES IN THE HAYMARKET.—MR. H. H. COLLINS, F.R.I.B.A., ARCHITECT.



PLAN AND VIEW OF SCHOOL PREMISES AT DOVER.
MR. J. TREADWAY HANSON, F.R.I.B.A., ARCHITECT.

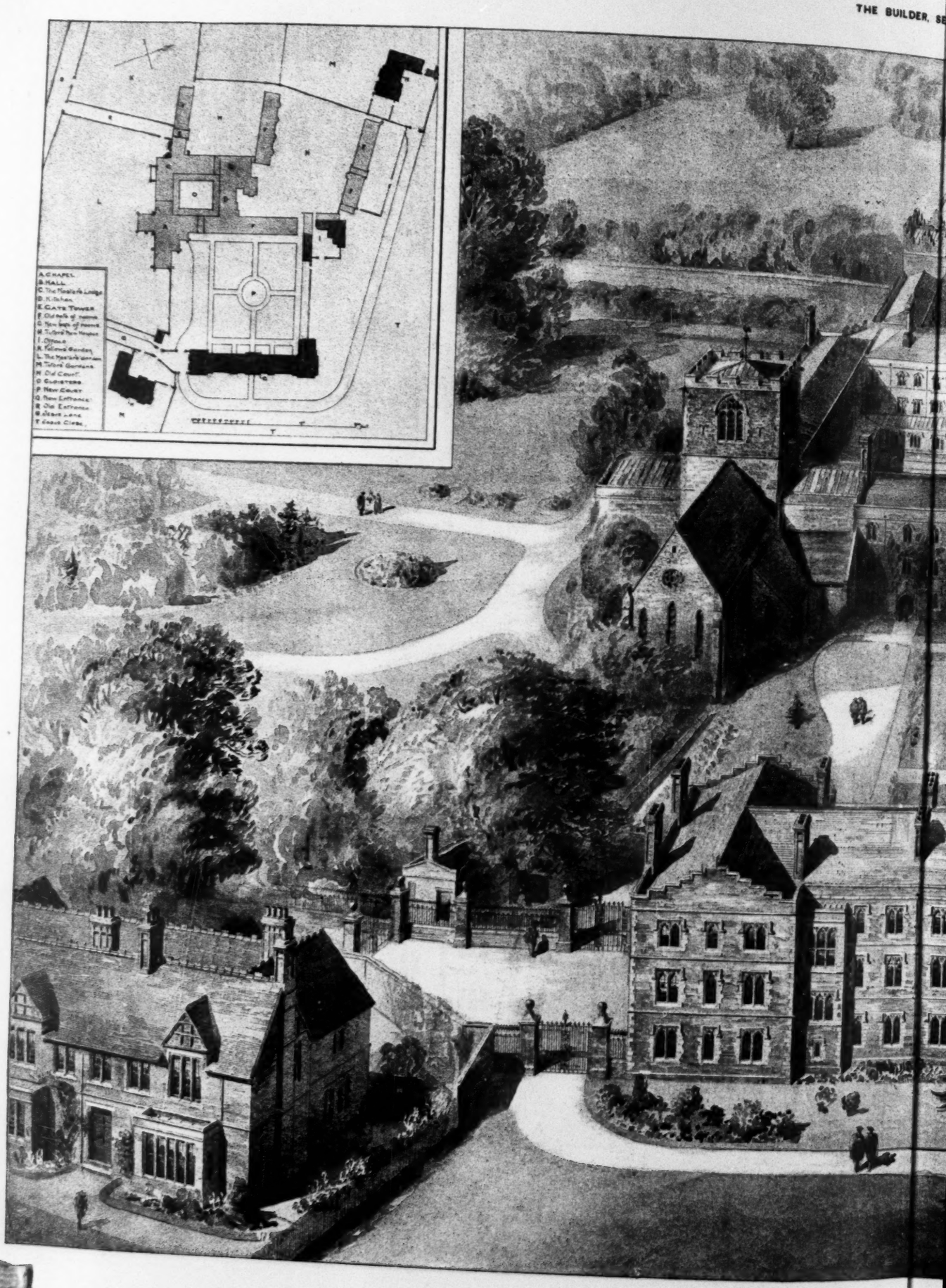


GROUND PLAN

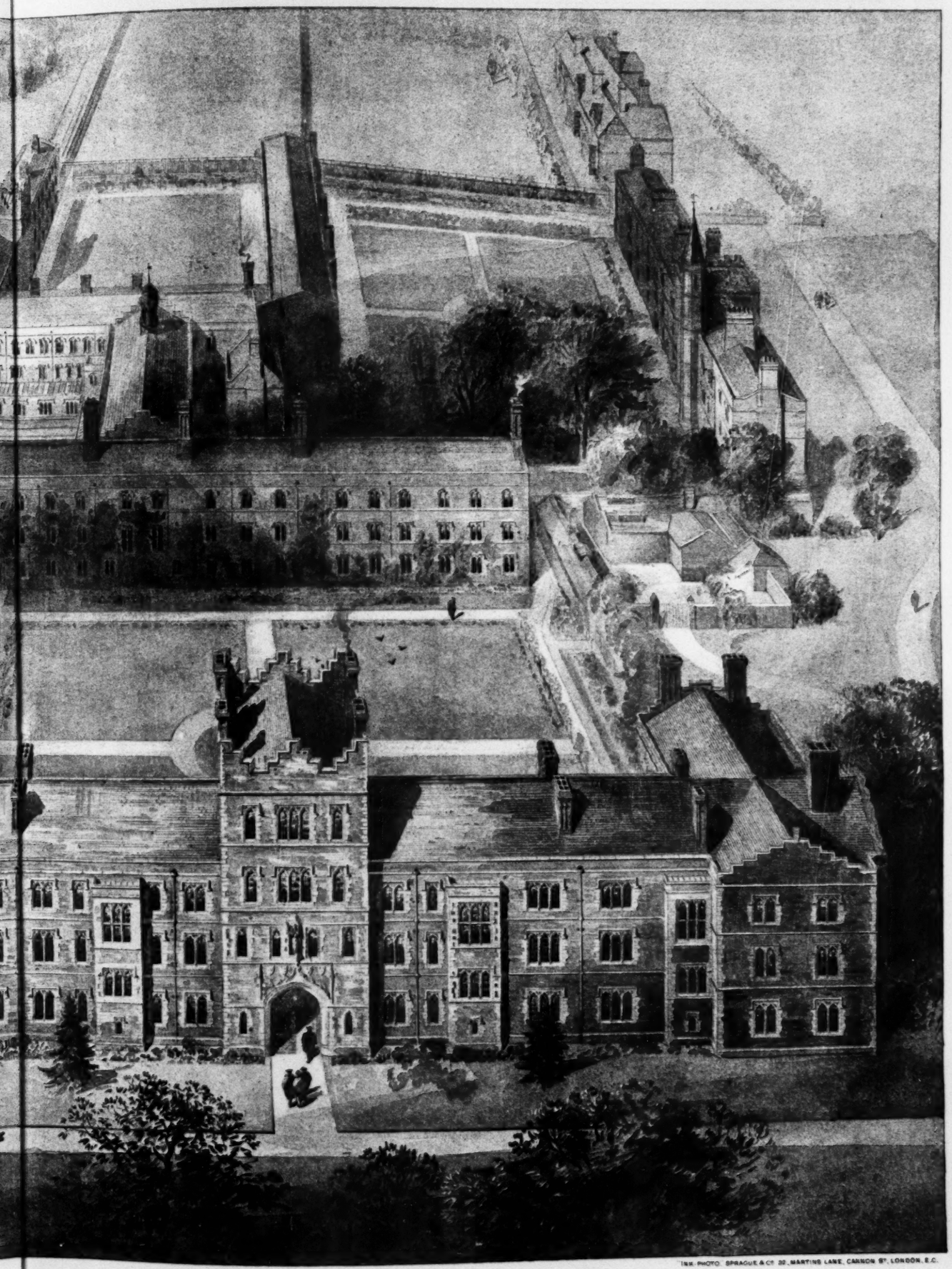


PREMISES AT NORWOOD FOR THE LONDON AND COUNTY BANKING CO., LIMITED
MR. HORACE CHESTON, F.R.I.B.A., ARCHITECT.

Wyman & Sons Photo-Litho Co Queen St London WC



ADDITIONS TO JESUS COLLEGE, CAMBRIDGE.—



TINT-PHOTO. SPRAGUE & Cº 32, MARTINS LANE, CANNON ST. LONDON, E.C.

RIDGE.—MESSRS. CARPENTER & INGELOW, ARCHITECTS,

buildings along its north side, where at present left open to show the trees beyond it.

The Master's Lodge has been the last work undertaken, and it has been altered very considerably inside from its former dark, ill-ventilated, and inconvenient state, and a new staircase has been erected, and a new porch and bay window, with many other structural alterations.

The Undergraduates' Block, with the Porter's Lodge gates, &c., has been carried out by Mr. Bentley, of Waltham Abbey, the tutors' houses and the work to the ancient wing and offices by Messrs. Rattee & Kett; and the alterations of the Master's Lodge by Mr. Foster, of Kempston; the ironwork is by Mr. Jones, of Manchester; and the grates by Mr. D. O. Boyd, of Maddox-street. The clerk of works (excepting for the lodge works) was Mr. Higgs.

In the three niches of the new block are statues executed by Messrs. Singer, of Frome, of the Blessed Virgin, St. Rhadegund, and St. John; the ancient statue of Bishop Alcock stands in a corresponding niche over his gateway.

The small scale plan with references shows the general dispositions of the buildings, the new portions being indicated by the darker tint.

RESIDENCES AT TUNBRIDGE WELLS.

THESE houses are situated in Limeshill-road, immediately facing the well-known Tunbridge Wells Common. They are built with red brick, having Bath stone and blue brick dressings and sill courses, partly covered with ornamental and plain weather tiling and half-timbered work, with stucco and incised work, the roofs being covered with red and black tiling. They are built on the hard white local sandstone, and are fitted with the electric light. Care has been taken with regard to the sanitary arrangements.

The houses have been designed to meet a demand in Tunbridge Wells for residences of an economical character, and yet possessing more artistic feeling than the cement and stucco residences with which the place abounds.

The houses have been constructed by Messrs. Oakley & Drake, builders and contractors, of Tunbridge Wells, and have been designed by Mr. W. H. Oakley, architect, of London.

NEW PREMISES IN THE HAYMARKET.

THIS building, at the corner of the Haymarket and Coventry-street, being the first block erected in the Piccadilly Improvement Scheme, is French Renaissance in character, and was designed by and carried out under the supervision of Mr. H. H. Collins, of Old Broad-street. The lower portion is built of Whitbed Portland stone and granite and the upper part of Beer stone.

It presented many difficulties in construction, the basement, ground, and first floors, and three upper floors, being entirely distinct and separated by fireproof construction. The basement and ground-floor being appropriated for shops, the first-floor being left as one large room for the purposes of an Exhibition-room or large hall, and the upper portions being intended for residential chambers, the whole weight is thrown on the lower floors, and the arrangement of the necessary ironwork required much careful consideration. The cost of the building has been about 21,000*l*.

The contractor was Mr. Wm. Brass, of Old-street, E.C.; the ironwork and fireproof construction were supplied by Messrs. Dennett & Ingle, with the assistance of Mr. Ordish, the engineer; the stained glass by Mr. Wm. Gibbs, of Kingsland-road; the ornamental ironwork by Messrs. Brawn & Co., of Birmingham; the mosaic paving by Messrs. Diespeker & Co.; and the carving was executed by Mr. Sanson.

SCHOOL PREMISES, DOVER.

ON one of our lithographic sheets we give a view and plan illustrating a block of school buildings with master's residence recently erected at Dover, on the side of Castle Hill, overlooking the town and commanding a view of the sea beyond.

The buildings were erected from the designs and under superintendence of Mr. J. Treadway Hanson, F.R.I.B.A., for Mr. J. Stanton Wise, M.A., to meet the requirements of a private high-class school for boys.

The master's house and school department are kept quite distinct from one another, but have communication on each floor. The former is entered from the higher level, and the latter from the lower level.

The lower floor (there is no basement) of master's house contains, in front, kitchen offices, and towards garden front, private dining-room with steps down to garden. On the same floor of the boys' department are the dining-hall, assistant master's room, lavatory, &c. Each department has a separate staircase.

The plan of the principal floor is shown in the illustration, and above this (in master's house) are bed-rooms, bath-room, &c., and in the boys' department, dormitories, cubicles, bath-rooms (on each floor), and assistant masters' rooms.

There is also an isolated infirmary ward, with bath-room and nurse's room.

The buildings are in red brick and Bath stone, the roofs are tiled, and the joinery is in pitch pine.

The contractor for the works was Mr. W. J. Adcock, of Dover.

NEW PREMISES FOR THE LONDON AND COUNTY BANK, UPPER NORWOOD.

THIS building, recently completed, stands at the top of Westow Hill, close to the Crystal Palace, having a frontage to the main road of 36 ft. with a return frontage at the side of 31 ft. The bank entrance is in the main street; the entrance to the manager's residence and the tradesmen's entrance being at the side. The entire space on the ground and basement floors is taken up with the banking offices, strong-rooms, book-room, clerks' lavatories, and cellars, the two floors above the bank forming the residence for the manager.

The materials used in the elevations are Lindley's red Mansfield stone on the ground-floor and in the main cornice at the top, and red Fareham bricks above the ground-floor, the pilasters and window dressings and all the brickwork at the corner being in gauged work.

The walls of the strong-rooms are formed of gault brickwork in cement (with a tier of hoop-iron bond laid between every course for greater security), and are lined with white glazed bricks. The roof is formed in strong cement-concrete, 14 in. thick. with 10 in. rolled iron joists embedded in it, 12 in. apart.

The internal doors and joinery of the bank, including the screens and desk fittings, are executed in American walnut. The brass work of the desk-rails, standards, and gas-fittings has been made by Messrs. Wenham & Waters, of Croydon, to designs specially prepared for the bank by the architect. The whole of the works, including the internal bank fittings, have been carried out by Mr. Martin Taylor, of Croydon. Mr. G. G. Woodward acted as clerk of the works, under the superintendence of Mr. Horace Cheston, architect, of Great Winchester-street.

THE EFFECT OF FREEZING ON CEMENT MORTAR.

IN a recent number of the *Builder* (see vol. lii., p. 255), the experience of German architects in the use of lime mortar during frost was given, from which it appeared that, if lime mortar is exposed to the action of frost for some days, it sets as firmly as mortar made in summer. This experience has been confirmed in the case of cement mortar by observations made in America, which reveal the fact that the behaviour of cement mortar in cold weather is even more favourable. From a paper read by Mr. Alfred Noble before the American Society of Civil Engineers, and published in the Transactions of the Society, we learn that in the construction of a lock at the St. Mary's Falls Canal (Michigan), between Lake Superior and Lake Huron, the laying of masonry was discontinued about the end of October in each year on account of the frequent recurrence of freezing weather. On the last day of work in 1877 mortars of Portland cement and of a good quality of American natural cement were used in adjoining portions of the wall. The same proportions of cement and sand, 1 to 1, were used in both classes of mortar. This masonry was laid during a slight rain. The following spring the surface of the Portland cement mortar was sound, showing perfectly the marks of the rain drops. The natural cement mortar was disintegrated to a depth of from 3 in. to 4 in. In the same locality it was necessary to lay a concrete foundation for a movable dam in February. The weather was extremely cold, generally about zero. The mortar was made with Portland cement. Salt was used freely, but without retarding much the freezing of the concrete. The concrete was at once covered with a floor of timber and plank on which the masonry abutments were built. Samples of the frozen mortar set properly after being put in a warm place. There was never any settlement of the masonry, and within a few months the concrete sustained a pressure of 15 ft. of water without developing any leaks. In the construction of a bridge across Clark's Fork of the Columbia River, in North-western Montana, the caissons were filled with concrete during freezing weather. Portland cement was used. The proportion of cement to sand was 1 to 3. Within a week the laying of stone masonry was commenced on these caissons, and proceeded with as rapidly as possible, without apparent injury to the concrete, which had set firmly. In these cases the temperature had risen above freezing-point within two or three days after the concrete had been placed, and it had been permeated to some extent by warm air escaping though leaks from the air-chamber. The last case quoted by Mr. Noble is the St. Louis River Bridge on the Northern Pacific Railroad, near Duluth (Minnesota), where four small piers were built in the winter of 1884-85. During the laying of masonry for pier 1, the temperature varied from 0 to 20 degrees; during the building of pier 2 the temperature was about 20 degrees higher, and during the construction of the two remaining piers the temperature was occasionally above freezing-point. Portland cement was used throughout, the proportions of cement to sand being 1 to 1½ for face-stone, and 1 to 2½ for backing. During extremely cold weather salt was used freely in the mortar, and the sand was warmed (not made hot); but with the thermometer at 20 degrees the mortar froze quickly after being spread on the stone,—so quickly, indeed, that, if the stone, being set, could not be brought to a bearing by a little shaking, it was necessary to raise it again, scrape off the now frozen mortar, and spread a new bed. In setting the face-stone the mortar was kept back from the face an inch or so to facilitate subsequent pointing. A few weeks later, after there had been milder weather, an examination of the open edges of the mortar beds showed that the mortar used during the coldest weather had set firmly, and no difference could be detected by examination of detached fragments between the mortars in piers 1 and 4; that is to say, between that laid in the coldest and that laid in the mildest weather embraced in the period of construction of these piers.

In the discussion which followed the reading of the paper, some confirmatory results were given by other members of the society. Mr. G. S. Morison mentioned an accidental experiment that occurred in the winter of 1885 in the work of the Omaha bridge (Nebraska). Mr. Morison had a number of briquettes made of American cements and imported Portland cements, which were exposed to the air for twenty-four hours and then left in the customary way in a pail of water. Extremely cold weather set in, and the entire lot became a solid block of ice. When it thawed, the Portland cements were entirely uninjured, but the American cements were entirely ruined, some of them being reduced to mud. Subsequent experiments showed that the cements which stood freezing three days after they were made could stand freezing immediately after they were mixed. Mr. R. B. Stanton said that he had some experience in laying masonry in very cold weather. In the winter of 1878-79 it was found that a small pier on the Cincinnati Southern Railroad was defective. The pier was taken down and rebuilt with Louisville cement, and with the use of salt. The thermometer at the time ranged from 6 to 10 degrees below zero. The iron trestle was put upon the pier, and during the winter no change in the masonry was noticed. When, during the next summer, it became very hot, the pier seemed to sweat, the salt came out and made the sides white, but the cement was as hard as if it had been laid in the summer, and there has never been any trouble with the pier. Mr. Stanton further stated that in the winter of 1881, at Denver, Colorado, in building the round house and shops

of the Union Pacific Railroad yards, it became cold very suddenly. The work was proceeded with, and salt was used in lime mortar, and every night the top was covered with a thick coating of salt; the mortar was not really frozen. The next summer a locomotive got away and struck this masonry between two windows, tearing away the lower portion and leaving the whole keystone portion above suspended and held up by the mortar, and this masonry hung thus for several weeks. Some years ago Mr. E. C. Clarke made a number of experimental batches of concrete, some of Rosendale cement, and some of Portland cement. Of these, a portion was made with a large proportion of cement, and some weaker, of each kind. They were made just before freezing weather, and were left for two or three years exposed. During the first winter the Rosendale concretes, without exception, began to weather badly on the surface, and from year to year disintegrated. None of the Portland cement concretes were affected in three years, although lying right on the surface of the ground in blocks about 1 foot square. Mr. Shanahan, the Superintendent of Public Works of the State of New York, expressed the opinion that he would as willingly build masonry in the winter as in the summer, so far as its durability is concerned. He uses Rosendale cement in building masonry, a tolerably strong mortar,—that is, a large proportion of cement to sand,—and always uses in mixing only the strongest brine. He never knew of a case to fail when built in that way. Mr. John Bogart also stated that the result is very satisfactory when using a strong solution of salt for mixing the mortar. Without the proper use of salt, the masonry gives way, and gets into a bad condition.

GLASGOW INSTITUTE OF ARCHITECTS

ON Thursday in last week the annual excursion of this Institute took place, the destination being Dunblane and Doune. The party numbered about twenty, and left Glasgow at 9·20 a.m. arriving at Dunblane at 10·40, where they were received at the Cathedral by the Rev. Mr. Ritchie, minister of the parish; Mr. Alexander, clerk to the heritors; Mr. Barty, agent for several heritors; and Dr. R. Rowand Anderson, architect for the proposed restoration. Among others present there were:—Mr. David Thomson, President of the Institute; Mr. John Honeyman, past-president; Mr. T. L. Watson, treasurer; and Mr. Thomas Turnbull, a member of the Institute practising in Wellington, New Zealand, and at present on a visit to Europe. Mr. David Robertson, the president of the Institute of Measurers; and Mr. A. Lindsay Miller, secretary of the Architectural Section of the Philosophical Society, and other guests were also present. Dr. Anderson conducted the party to the choir, where (we quote from the report in the *Scottish News*) he recounted what was known or surmised of the history of the cathedral. In the adjoining aisle he exhibited some old illustrations and his own drawings of the building, and described some of the proposed restorations, dwelling particularly on certain points of great obscurity and difficulty with which he had been encountered. On these he invited the suggestions of members. The party then spent some hours in a careful examination of the whole structure, and in consideration of some of the points of difficulty. It is interesting to note that Dr. Anderson does not intend to renovate or restore the wasted or defaced architectural members. His restoration is to be confined to the rebuilding of the parts actually ruinous, with, of course, a new roof and floor and the glazing of the windows. The walls and pillars of the building were originally covered with a thin coating of plaster, which was afterwards decorated. No attempt will be made to restore this. The broken and wasted mouldings and carvings are not to be touched. Satisfaction was expressed by the visitors that the renovation was not to include the effacement of the present character of the building, as has occurred in so many other cathedrals and churches. The party then visited the ruins of the Episcopal Palace, and a call was afterwards made at Archbishop Leighton's Library, where some of the more curious of the old volumes were examined. At half-past one lunch was served at the Stirling Arms Hotel, and a vote of thanks was passed to the Rev. Mr. Ritchie and Dr. Anderson. At 2·43 train was taken for Doune, where the castle was visited. Mr. Dunbar, the custodian, conducted the party over the building, which is interesting as one of the largest and best-preserved of the castles of Scotland. The afternoon was agreeably spent in examining the numerous fine apartments of the building, in tracing the remains of outworks, and in enjoying the beautiful prospects from the battlements. In the evening dinner was served in the Woodside Hotel, when Mr. David Thomson, the president, occupied the chair, and Mr. T. L. Watson, the vice-chair.

BOYLE'S "C.C." VENTILATOR.

THIS ventilator is an adaptation of the cowl made by Messrs. Robert Boyle & Son, which is a modification of the self-acting air-pump ventilator. The "C.C." ventilator is designed to be applied to buildings where cost is often the first consideration, and though it is not pretended that it is such a powerful exhaust as the latest improved form of the air-pump ventilator (1882 patent), it is recommended by the inventors as useful for such buildings as steam laundries, engine-rooms, workshops, cow-houses, stables, &c. It is also capable of application to schools and meeting-houses.

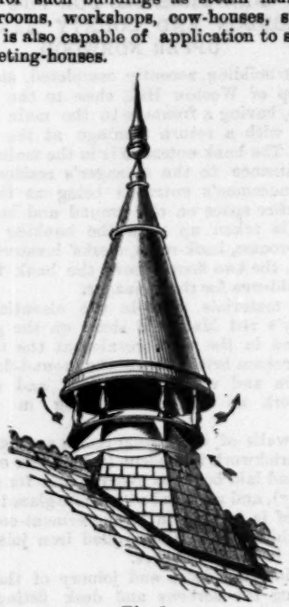


Fig. 1.

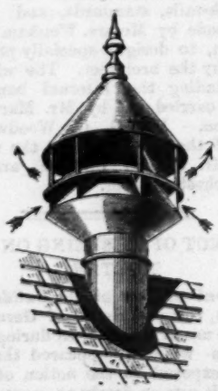


Fig. 2.

Fig. 1 shows the design most suitable for this class of building, whilst Fig. 2 is the form usually employed for workshops, &c.

New Cemeteries.—The new cemetery at Armley, in the borough of Leeds, was opened on Saturday, the 20th of August, by Mr. Barnsbee, chairman of the Burial Board, to whom a silver key was presented for the purpose. Mr. J. P. Pritchett, of Darlington, is the architect.——The ceremony of opening the new cemetery at New Shoreham, Sussex, took place on the 18th ult., the bishop of the diocese at the same time consecrating a small portion of it. The ground is somewhat pear-shaped, and is surrounded partly by hedges and iron fences. A caretaker's lodge, of red kiln bricks and panelled random flintwork, and an oak lych-gate, occupy the entrance, both these erections being covered with red tiles. Mr. Arthur Loader, of Brighton, was the architect.

"LANDSLIP, DORKING TUNNEL."

SIR,—A letter in the last number of your paper, headed "Landslip, Dorking Tunnel," and signed "Surveyor," has been brought to my notice; and, as it contains several mis-statements calculated unnecessarily to alarm the public, I shall be obliged if you will kindly insert this letter in reply in your next number.

The tunnel has for some months been under repair, many of the bricks forming the inner lining (not the outer course, as described by your correspondent) having partly perished. These have been from time to time cut out and replaced by sound bricks, but this work has been principally at the north end of the tunnel. No bricks had been cut out at the portion of the tunnel where the disaster occurred, and therefore the arch had not been dangerously weakened at this point, as your correspondent implies.

The description of the brickwork that has fallen is purely imaginary, as the timbering is not yet sufficiently advanced to enable the extent of the fallen brickwork to be ascertained.

No bricks have slipped from the crown of the arch except where the crown has fallen in bodily, but certainly not near the mouth of the tunnel, as stated by your correspondent. The repairs are now being carried out by Mr. Firbank, with a staff thoroughly experienced in this kind of work, and the public may rest assured that the tunnel will not be re-opened until it is thoroughly restored and fit for traffic. The particular disaster which has alarmed your correspondent is, in my opinion, owing to the accident (which he alludes to) which occurred during the original construction of the tunnel not having been properly repaired, the patching and mending being merely the replacement of decayed bricks on the inner surface, which is a very common feature in the maintenance of old tunnels.

FRED. D. BANISTER, Chief Engineer.
L.B. & S.C.R., London Bridge Terminus,
August 31st.

WEIGHT OF FIREPROOF FLOORS.

SIR,—Every domestic floor should bear safely, besides its own weight, a distributed load of 100 lb. per square foot (and warehouse floors, according to their destinations, from twice up to five times that load), without subjecting any iron to a tensile strain over 8 tons per square inch; for the "25 tons" of Lord Grimthorpe, in his "Essay on Domes," is quite unpractical, being the extreme limit of English iron's tenacity, which is known to be permanently stretched by any strain over a third of that limit. Now, if Mr. Brannon or Earl Wemyss were to give us the whole weight per square, and the weight of iron per square, wherewith their construction ensures these conditions in floors of two very different spans, say 10 ft. and 30 ft., we could infer the corresponding weights for any other span, it being certain that, calling their span s, both the total weight per square and that of iron per square must be expressible in the form $as+b$, with a and b two constant numbers. But this is what I cannot gather from Mr. Brannon's specifications, which, of course, I studied before making my own on the same problem. Indeed, his latest, dated 1874, nearly convinces me that thrice the total weight I hold necessary, and four times the iron, would be hardly sufficient quantities for a safe timberless floor of his construction. With rightly-formed clay tubes and flat bar-iron I undertake to support safely the 100 lb. per square foot, on floors that, calling their span s feet, shall contain but these weights:—

Pounds of clay per square $= 33\,s + 1{,}800$.
" iron " $= 3\,s + 3$.

For stronger floors the iron might be increased up to fivefold with no increase of the clay.

Such floors can also be boarded without becoming less fire-resistant, the whole quantity of wood not exceeding once and a quarter the boards, and being cut off from all under-draught.

My methods for roofing and for stairs are equally light and cheap, and with fewer forms of tube; but I only speak here of flooring as the main part of the fireproof problem. E. L. GARBETT.

BUMBLEDOM AND THE SANITARY ACTS.

SIR,—You have often pointed out in your valuable journal the weak points in the Sanitary Acts. Although these Acts give as large and ample powers as could be desired, yet as the weakest link in a chain is the measure of its strength, so is the willingness of the administrative authorities to carry out their Acts the measure of their value.

The administration of the Sanitary Acts rests, as far as country districts are concerned, with the Rural Sanitary Authority, who frequently in practice depute their powers to a parochial committee.

Too frequently this parochial committee is more interested in keeping down the rates than in promoting sanitation. Allow me to relate my own experience as an exemplification of this. I have been for years a resident in the parish of Freshford, which is under the Rural Sanitary Authority of Bath. My house is situate in the lower portion of a valley, being the last of some eighteen, and the only drainage we possess is an open ditch, which empties into the adjoining Avon. This ditch, unfortunately for me,

flows close to my sitting-rooms and along my garden. It receives, amongst other offensive matters, the waste of a brewery, and the offensive drainage of some stables. When the rainfall is heavy, the nuisance is less pronounced; but in a dry season like the present, the stench combines all the odours that pervade Cologne.

Now, sir, for the moral of my tale. Year after year have I appealed to the Rural Sanitary Authority to construct a proper drain to take the drainage of the valley. In this valley there are eighteen houses, besides the brewery and stables I have mentioned. Year after year my complaint has been forwarded to the Parochial Committee by the Sanitary Authority.

The Parochial Committee wait till a thunderstorm has cleared the ditch, and then gravely report that no nuisance exists. One of my neighbours suggested to the Rural Sanitary Authority that the opinion of a sanitary engineer should be taken as to the sanitary needs of the village, and he offered to obtain such report at his own expense, provided the Sanitary Authority would carry out its recommendations. I send you cuttings from a local newspaper, the *Bath Journal*, which will show you the spirit in which this reasonable suggestion is received. The suggestion that an engineer should be consulted was received with loud cries of "No, no"; and the suggestion that an engineer who made these subjects his study was more likely to form a just appreciation of the needs of the case was received with shouts of laughter.

Now, sir, I do not wish to dwell on my own grievances. I only put it forward as a typical case to show the weak points in the working of the Sanitary Acts.

To make these Acts efficient their power should be entrusted to skilled professional men, who should be empowered to carry out what they deem necessary despite all the objection that Bumbledon may raise. Until this is done the Acts will remain in many of the rural districts a dead letter until typhoid fever, cholera, or some deadly epidemic convinces even ratepayers that the laws of sanitary science are not to be defied with impunity.

ABERCROMBY WILSON.

THE REGISTRATION OF PLUMBERS.

SIR,—With reference to the recent resolution of the British Medical Association in favour of the registration of plumbers [see *Builder*, p. 286, *ante*], will you favour me with space to say that this Company has established a register for plumbers, by which the public may distinguish those plumbers who have given evidence of their qualification as plumbers in conformity with clauses 4 and 5* of the Company's conditions. The register, which embraces both masters and journeymen, now includes the names and addresses of several hundred plumbers in London and the provinces, and lists are furnished free on application. In connexion with the City and Guilds Institute special classes of instruction, and examinations for plumbers, have been established, and, in co-operation with that Institute, this Company is using its utmost efforts to extend technical training among plumbers, who will be hereafter required to pass an examination in both the principles and practice of plumbing to entitle them to registration. This company is thus doing its part to the full extent of its available means, both to enable the public to distinguish those who are competent among the existing practitioners, and also to provide for the adequate training of the coming generation of plumbers. But it rests with the public authorities, architects, and the public generally, to help forward the movement by requiring that the plumbers they engage should have given evidence of their being qualified craftsmen. The benefits of the movement are, I hope, becoming more widely recognised, and we feel that the resolution of the British Medical Association should go far to impress the public with the fact that the medical profession are fully alive to the necessity for registering qualified plumbers in the interests of the public health.

STUART KNILL, Alderman (Master).

1, *Adelaide-buildings, London Bridge*,
August 27th.

INSCRIPTION AT WELLOW CHURCH.

SIR,—The inscription in the Hungerford Chapel, noted in your paper of the 20th, and referred to by "E. T. S." [p. 316, *ante*], runs thus:—

"ffor the love of Jhu and Marie is sake,—
Pray for them that this lete make."

The suggestion that the meaning was "Pray for them that built this Chapel" was discussed by the members of the excursion party, as was also the suggestion that "lete" was a corruption of the French "lit," a bed, in which case the meaning would be, "Pray for them that make their bed here," or "for them that lie here."

AN EXCURSIONIST.

* 4. Plumbers (Masters and Journeymen) established in the trade prior to March 1st, 1888, are not necessarily required to undergo any examination. Admission is granted to such plumbers on satisfactory statement or proof of experience, according to the circumstances of each case. 5. All applicants who cannot satisfy the Registering Committee of their experience are required to pass an examination by a Board of Examiners, composed largely of practical plumbers.

CHURCH-BUILDING NEWS.

Haigh.—St. David's Church, Haigh, near Wigan, the new chancel of which was consecrated by the Lord Bishop of Liverpool, on the 3rd ult., was built originally from the designs of the late Mr. Thomas Rickman, one of the pioneers in the revival of Gothic architecture. The original church was a plain parallelogram, with a flat plastered ceiling and plastered walls, and plain pointed windows on each side. A few years ago Mr. Medland Taylor, of Manchester, was consulted as to what could be done at moderate cost with the existing church, and last year the work of actual building was taken in hand. A spacious chancel has been built, and on the south of it an organ and choristers' vestry projects transept-wise, and to the east of these is the clergy vestry. The chancel arch is pointed, but it is of very broad proportions, so as not to protest too much against the low flat ceiling of the nave. The chancel and the east wall of the nave are almost entirely of stone. Internally, the very effective streaked Runcorn stone is used. The chancel fittings are all of Dantzic oak, and the screens in the arches adjacent to the chancel are traceried, and of the same material. On the north side, one bay from the east end, is a lean-to porch. In the floor-tiling are George Herbert's well-known lines:—"Bring not thy Plow, thy plots, thy pleasures thither, Christ Purged His Temple, so must thou thy heart." The gallery has been re-seated with open benches made out of the old framing. The benches in the nave are of pitch-pine. The plain plastered ceiling of the nave has been divided out into panels with wood mouldings and cusping. The chancel is lighted by two large candelabra brackets, north and south, the nave by eight pendants hung from the ceiling. The gallery, by some of the old gas standards. The funds for the work have been provided by public subscription, the Earl of Crawford, Mr. Rawcliffe, Mr. Fair, and others being amongst the larger contributors. The work has been executed by Mr. Winnard.

Kennington.—The Church of St. John-the-Divine, Vassall-road, Kennington, which was erected some years since from the designs of the late Mr. Street, R.A., is about to be completed by the erection of the tower and spire. This church has already cost upwards of 20,000*l.* The works for the erection of the tower have just been commenced, the foundation walls being carried to a depth of 10 ft. below the ground line. At the base the tower will be 25 ft. square, the height of this portion of the structure being 108 ft. to the cornice. It will be faced with red bricks, 2 in. thick, specially made for the occasion, with Bath stone dressings, and will be in every respect uniform with the architectural character of the church as already erected. At each angle of the tower massive buttresses having ornamental stone capitals will be carried up to within a few feet of the cornice. On each side of the lower portion of the tower there is a central Gothic window, 28 ft. in length. The upper portion will contain the belfry and floor of the bell-loft, and is intended to be fitted for a peal of eight or ten bells. The west entrance to the church will be immediately under the tower, the doorway being surmounted by a crocketed gable, with pinnacles on each side. The spire, which will be entirely faced with stone, will rise to a height of 104 ft. above the tower, the entire height of the structure from the ground line being 212 ft. The bell-loft will be reached by a winding staircase at the north side of the tower, in which it is proposed to place an illuminated clock and chimes. The structure is being erected from the designs of the late Mr. Street, under the superintendence of his son Mr. A. E. Street. Messrs. Dove Brothers are the contractors, and Mr. Osborne is foreman of the works. The tower is being erected in commemoration of the Queen's Jubilee.

An Argentine Railway.—The Argentine Government have ratified a contract with Mr. John Jackson, of Clement's-lane, London, for the laying of 450 miles of railway, at a calculated cost of two and a quarter millions of pounds. The permanent ways, all being of English manufacture, will consist of three separate lines.

STAINED GLASS.

Chester.—The large south transept window of Chester Cathedral, of which the stonework has been re-designed by Mr. A. W. Blomfield and carried out by Messrs. Thompson & Son, of Peterborough, has been filled with stained glass, and was seen for the first time on Sunday, the 7th ult. The restorations and stained glass are the gift of Lord Egerton of Tatton. The window consists of seven large lights and tracery, and the subjects represented are the Crucifixion, Nativity, and Ascension, occupying the three centre lights, and sixteen subjects illustrating "Faith," taken from the eleventh chapter of Hebrews, are grouped around, filling up the lights on either side, the tracery being filled with a representation of the Angelic Choir. The window is designed in the spirit of "Old Glass," no attempt being made to copy the "Munich" or "Pictorial" school, Lord Egerton wishing to have a mosaic effect of colour, combined with figure drawing after the Italian Gothic school. The inscription reads as follows:—"To the Glory of God and in memory of William Tatton, first Baron Egerton of Tatton, Lord Lieutenant, and Chairman of Quarter Sessions, County of Chester, died February, 1883. His son Wilbraham, Baron Egerton of Tatton, restored this window August, 1887." The work was designed and executed by Messrs. Heaton, Butler, & Bayne, under the architect's supervision.

Copston Magna (*Warwickshire*).—The east window of Copston Magna Church has been filled with stained glass in memory of the Toone family, at the cost of its surviving members. It has three lights, and contains the Nativity, the Crucifixion, and the Entombment, the traceries being filled with types of these events, the Burning Bush, the Pelican in her Piety, and Jonah devoured by the Whale, with the emblem of the Blessed Trinity, and monograms of the Holy Name. Under the main subjects are Three Angels holding scrolls inscribed with the words of the Apostles' Creed which refer thereto. The work was designed and drawn by Mr. N. H. J. Westlake, F.S.A., and produced by the firm of Lavers & Westlake under the direction of Mr. E. Swinfen Harris, F.R.I.B.A.

The Student's Column.

LAND SURVEYING AND LEVELLING.

X.—PLOTTING A PLAN.

FIG. 5 illustrates a good form of drawing table, having a slot or slots, as shown in the section, fig. 6, for the drawing-paper to slide into, when the draughtsman leans against the outer rail in the process of plotting. By the use of this precaution the drawing-paper is prevented from becoming creased when plotting at the top of the plan, as it can be pulled through the slot, as indicated by the dotted line in fig. 6.

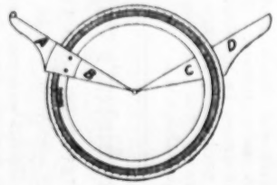
Fig. 8 illustrates the plotting of the angles taken between the base-lines in a transverse survey by means of the circular protractor. The station pegs which are indicated in the field, as shown by figs. 10 and 11, are marked upon the plan with a small pencil circle, surrounding the station point, as shown at the termination of the base-lines, Nos. 1 and 5, in fig. 8.

Fig. 7 illustrates Stanley's patent protractor, the construction being explained by its accompanying sections. By its use angles already plotted upon paper can be measured off without drawing in extra lines upon the map or plan. The instrument is formed of two concentric circular pieces. The outer of these circles is divided into degrees, and sub-divided either into halves or thirds of a degree, while the inner circle carries a vernier, which enables the operator to read to minutes. Two arms, as shown in plan and section, are mounted upon these two circular rings, and have each one of their edges radiating from the centre of the instrument. These arms can be moved to include any angle up to nearly 360°, the amount or size of which is then recorded by the index mark upon the scale of divisions. The instrument is made of metal, having the underside of the two radiating arms, and the lower surface of the outer ring, in the same plane; so that when the protractor is placed upon the plan, the arms can be set to the lines, between which the required angle is to be measured. If these

FIG 5

FIG 6

FIG 7 STANLEY'S PROTRACTOR

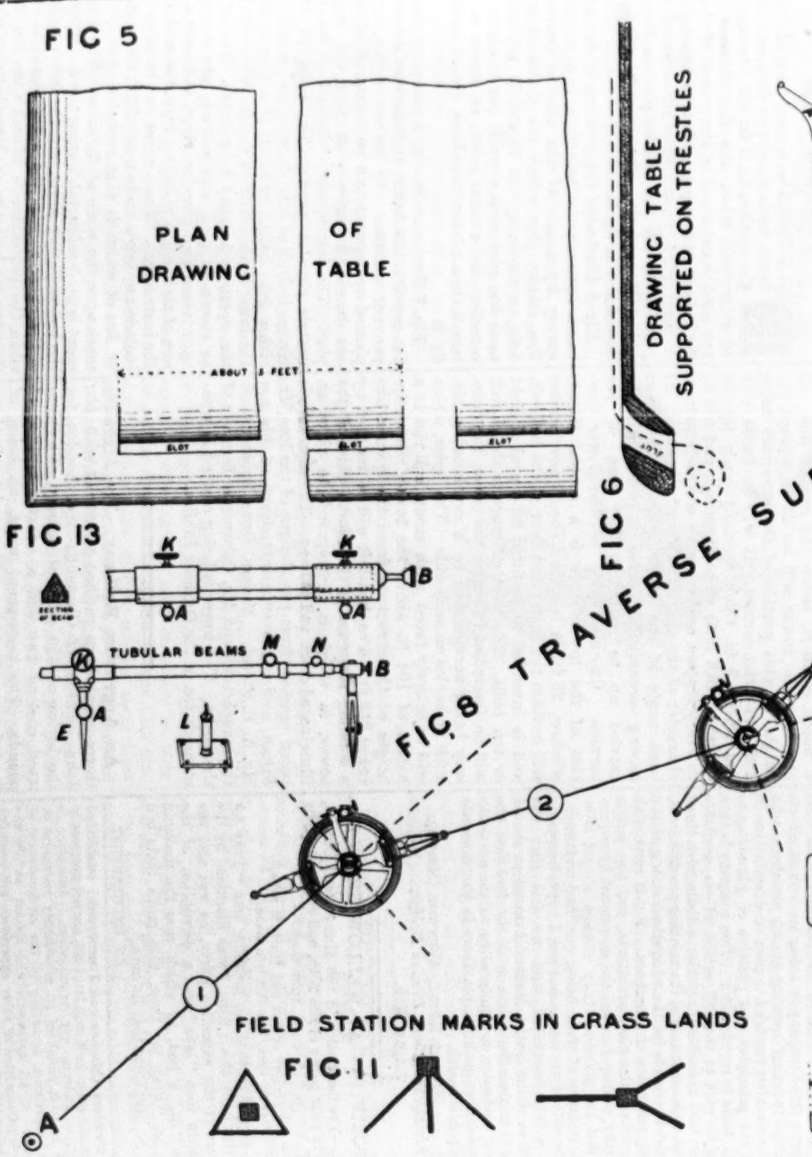


ENLARGED SECTIONS ON LINES AB AND CD

FIG 14 NEEDLE POINTER

FIG 13

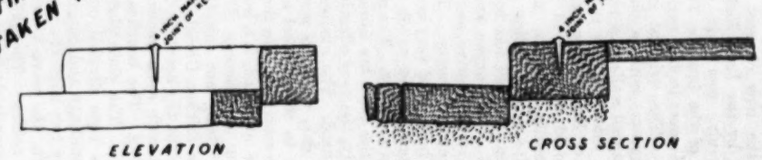
FIG 8 TRAVERSE SURVEY



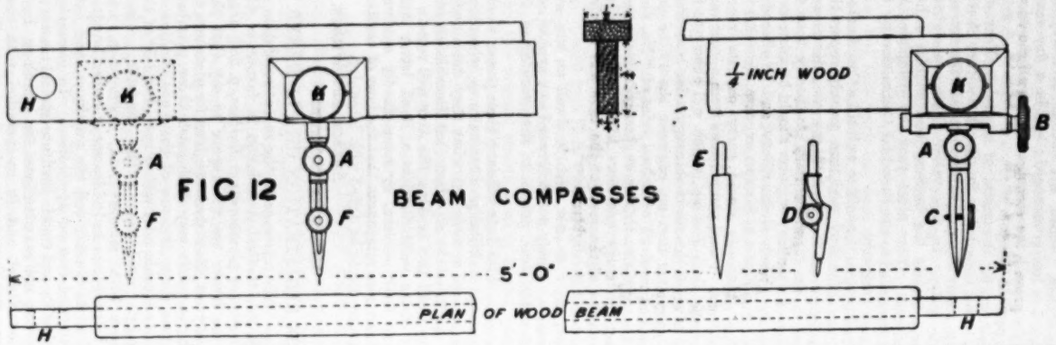
NOTE PLOTTING OF ANGLES, BETWEEN BASE LINES, TAKEN WITH THE THEODOLITE.

ROAD STATION MARKS ON KERBS

FIG 10

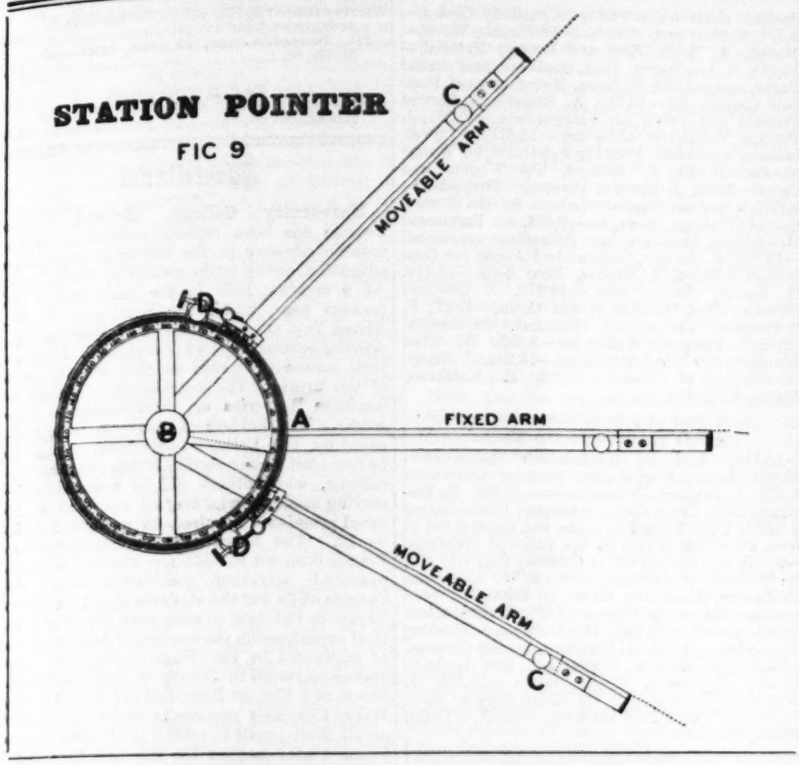


CHAIN SURVEY



FIELD STATION MARKS IN GRASS LANDS

FIG 11



lines do not actually meet, the length of the arm permits the angle to be set without producing the direction of the lines in pencil to determine their point of intersection.

Fig. 9 illustrates a station pointer, which is used in a similar manner to a protractor, but it will be observed there are two radiating movable arms with verniers attached, one upon each side of a central arm fixed at zero. These arms marked C are each set by means of their respective clamp and tangent screw at D, to the required angle with the line B A. The instrument thus clamped is moved about upon the plan, until the edges of the fixed arms B C, B A, and B C respectively coincide with the points upon the plan which indicate the stations observed, when taking the two angles with B A in the field. By means of a needle pointer (fig. 14) the position of B can then be fixed. Lengthening bars to the arms are provided with the instrument for use when required.

The best form of beam and compasses for plotting long base-lines from chain measurements only, is shown in fig. 12, the top table forming the letter T, giving lateral rigidity to the beam. When only a straight edge is used to hold the beam compasses for a long measurement, it is apt to become bent horizontally while striking in the arcs, and the length of the radius is thereby shortened. Fig. 13 shows two other forms of beams, one of a triangular shape, and the other of a tubular shape, the latter with a universal centre-piece marked L, the top of which fits into one of the boxes in place of the points E or F. The tube between M and N slides within the tube between K and M, and the tube holding B slides within the centre tube from M to N. Clamping-screws marked K, M, N, are provided for fixing the tubes in position at the required distance.

Books.

A Few Words on Portland Cement. By A MANUFACTURER. London: E. & F. N. Spon. 1887.

THE "Manufacturer" is Mr. D. L. Collins, of the firm of Gibbs & Co., Limited, who thinks, very reasonably, that in spite of the attention which engineers have given to Portland cement, the experience and opinion of a manufacturer who has been constantly handling it for many years, in the endeavour to produce stuff of a thoroughly good quality, ought to be of some value. The publication is a mere pamphlet of a few pages, and contains no superfluous words. The main point in it is the suggestion that the element of time is not sufficiently regarded at present in tests for tensile strength; or, rather, that its importance and significance are not rightly understood, and that cement may be mixed so as to ensure a high tensile test at a short date, which, if tested a longer date, would be found to give a lower result from excess of lime. He also wishes to draw attention to the influence of circumstances, state of the atmosphere, and treatment by the manipulator, &c., as varying the results of tests from the same cement. Indeed, he gives comparative tests at seven days' age of the same cement in two cases made up by the same gauger, and tested apparently in the same neighbourhood, giving breakage at 372 lb. and 510 lb. respectively. His experience, he says, leads him to the conclusion that there is still very much to be learned about the laws which govern Portland cement; and in this probably the most accomplished engineering experts will readily concur.

First Lessons in Science, designed for the Use of Children. By the late Right Rev. JOHN WILLIAM COLENSO, D.D., Bishop of Natal, 1853–1883. London: W. Ridgway. 1887.

THIS book was written to give general ideas on the broader outlines of science to a class of adult natives in Colenso's diocese. The present volume, as we see from the original preface, was intended as the first of a series; it deals with the main facts of astronomy, including those which concern the figure and movements of the earth; others of the series, which we conclude was not carried farther, would have dealt with geology and other branches of science in turn. What was adapted to the comprehension of the African adult is supposed, we presume, to be pretty nearly equally fitted for assimilation by the English child; and certainly the book is admirably adapted to give a young reader his first ideas as to astronomical truths, in language at the same time simple and scientfic; and no one will doubt that a mind so keen and eager as Colenso's would have kept abreast of the times in matters of this kind, and not deal out exploded theories to the youthful mind. It is curious, considering the terrible reputation as a "scoffing sceptic" which its author at one time enjoyed, that possibly the one objection which may be made to the book is that, for a scientific primer, there is a little too much religious preaching worked into it.

The Duties of a Clerk of Works. By JOHN LEANING. London: B. T. Batsford. 1887.

THIS is a small book, giving in a very brief and pointed manner the outlines of a clerk of work's duties. A little less brevity would have been as well in some places; for instance, in the paragraph on "Concrete" (p. 22), it should have been mentioned that rough and angular fragments should be employed in preference to smooth or rounded ones (one of the most important points in the production of good concrete); and, in the remarks under head of "Bricklayer," it might have been as well to give a reason for the direction, "See that cement is spread out and exposed to the air in a dry place before using it." The "clerk of works" will find the reason if he looks in the *Builder*, Jan. 3, 1885, "Student's Column," pp. 51, 52. The direction in regard to engaging a clerk of works, to inquire what he has previously done, "and engage none but those who have creditably superintended a building in that capacity," presents a certain difficulty, for in that case how is any one ever to begin being a clerk of works? Every man must have his first appointment in all branches of work. The quondam architect's assistant often makes a good clerk of works, says Mr. Leaning, "his knowledge of drawing and detail is of great advantage to him"; but "one of the disadvantages of this type of clerk of works is his possible interference with detail of which sometimes he knows more than his employer the architect, and is consequently tempted to deal with matters which are not in his province." That depends very much on what sort of man "his employer the architect" may happen to be; there are some with whom no clerk of works would venture to take such a liberty; others, certainly, who, conscious of their own shortcomings, might be grateful or indifferent. In a general way, however, our impression is that the engagement of a "quondam architect's assistant" as clerk of works is usually a capital thing for the said assistant; it enables him to complete his education in a practical direction,—at the expense of the architect's client. Even in such cases, however, a conscientious young man who means business and does his best, and takes care to get very full instructions from his principal, may be able to make mother-wit and close attention stand to a great extent in the stead of practical experience. The model clerk of works is only the development of experience; no one can really fill the office all at once. Let him begin on small and unimportant buildings, and so qualify himself for looking after the more complicated construction and conflicting interests in connexion with larger ones. And let him get Mr. Leaning's little book, which contains much common sense in a small compass, and will certainly be of use to him in the way of suggestion.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

9,186, Step Ladders. J. O. Nicholson.

According to this invention two or more ladders slide one within the other, with iron or brass or wooden guide strips fixed in the strings of one ladder and sliding in grooves in the strings of the other ladder. The strings of the bottom ladder are held together by dovetailed pieces across back edges, the bottom tread being a fixture, the other treads being pivoted on the back edge and chimed into quadrant shape so as to allow them to turn back and upper ladder to slide up or down in front of treads. Back stays slide on the same principle. The ladder can be extended and fixed at any height.

11,583, Purifying Air and Cooling Rooms in Dwelling-houses. C. H. Joliffe.

The ventilators which are the subject of this patent are screened by meshes of fine wire or cotton wool in layers, and the air is led through pipes submerged in tanks, whereby it is cooled. The admission and flow of air can be regulated at will, so that apartments may be kept at one desired temperature.

12,042, Casement or Fanlight Fasteners. H. J. Broadway.

These stays and fasteners are designed for holding the window firm in position when open, and giving greater security when closed. A bar or slide works on a flat bar or stay of metal, being held in position by an eccentric boss or lever which grips the bar, and so holds and fixes it in position. The stay or fastener according to this invention is simple and cheap.

17,158, Briquettes. S. P. Wilding.

The briquettes are, by this invention, made from ore, small coal, coal dust, saw dust, &c. Molasses and linseed oil are used to bind the mass, which is then subjected to pressure. This mixture gives a briquette which is impervious to moist air or water, even when the surface is injured.

7,966, Inlaid Floors. W. Boeling.

By this invention the flooring plates are made with a top and bottom plate connected by means of cross battens, and with the intermediate space filled in with pitch, asphalte, or any suitable material. The plates are then laid as a floor, part being laid in concrete; as, for instance, a border or pattern across.

8,648, Fireproof Column. A. W. Ramage.

The outside shell of the column or stanchion which is the subject of this invention is of rolled steel quarter cylindrical plates or plates with flanges riveted together, and used in combination with steel stays. Cement or concrete is used to fill up the hollow fireproof pillar.

9,808, Plumber's Portable Furnace. W. P. Thompson.

This furnace is adapted for use with naphtha, gasoline, or any of the light hydrocarbons. The receptacle for the liquid fuel is in the base or lower part of the apparatus, which base forms the foundation upon which the other parts are mounted and into which they are connected. Provision is made for placing the irons while heating. The oil is fed to the burner through the lower standard by means of an air pump (after the manner of the mechanism of a moderator lamp) contained in the apparatus, and the flow of the illuminating fluid is regulated by a needle-valve.

10,427, Cutting Edges of Wall-paper. J. & J. Eccles.

The paper is drawn through rollers, and circular cutters at each end trim the edges as the paper passes through. The improvements are in the direction of simplicity and strength of working parts.

2,291, Ventilating Apparatus. E. M. Young and G. B. Moss.

In connexion with the fireplaces of the room chambers are placed for exhausting the foul air from the rooms or halls. The air-chambers becoming heated the foul air is drawn from the apartment and passes up the chimney-shaft.

3,757, Hanging Doors and Casements. W. S. Pilditch.

By this invention the hinges are so placed that by working a groove of a quarter circle both in one of the back edges of the door and a similar one in the corresponding edge of the door-post the hinges will to the necessary extent become embedded in the two quarter circles, and by this arrangement the edge of the door and that of the door-post is constantly maintained in such close contiguity that for all practical purposes prying eyes are barred and draughts of air excluded. By a mechanical arrangement also, the door when required can be put back parallel to the wall without detriment or disturbance of the hinges. The leaf of the hinge is secured to a moulding or other elevation extending from top to bottom of the door and equal in height to the moulding of the architrave.

7,438, Saws for Stone or Marble. E. Edwards.

Sand is generally used in cutting stone. The blades or saws are, by this invention, so placed that they produce a rapid and continuous displacement of the sand under the rubbing action of the blades. Grooves are formed upon both sides of the blade so that they alternate with each other, or holes are pierced for the purpose of retaining the sand, and thus increase the cutting power of the saws.

NEW APPLICATIONS FOR PATENTS.

Aug. 12.—11,039, J. Kenyon and Others, Wind, Rain, or Dust Preventers for Doors.—11,045, A. Harris and J. Luckock, Window Fastenings.

Aug. 13.—11,068, J. Speakman, Paint Restorers or Removers.—11,078, T. Shelley, Securing Sheets of Zinc or other Metal to Roofs, &c.

Aug. 15.—11,109, J. Carrett, Preventing Smoky Chimneys.—11,119, J. Guest, Axes, Adzes, &c.

Aug. 16.—11,193, J. Halo and C. Simmons, Water-closet Pans and Traps.—11,196, E. Thomas, Door Fastenings.—11,205, H. Gregeen, Combination Gully-trap and Channel.

Aug. 17.—11,221, J. Sington, Screws and Screw-drivers.—11,244, T. Carpenter, Sliding Chandeliers, Gaseliers, &c.

Aug. 18.—11,283, W. Bull, Roofing Tiles, &c.—11,287, De Pennefather, Ventilating Rooms, &c.—11,297, H. Lake, Door Latches.—11,304, J. Gilbert and J. Golding, Fastening for Windows and Sashes.—11,316, R. Wyatt, Flushing Cistern and Water-waste Preventer.

Aug. 19.—11,321, W. Harrington, Adjusting and Attaching Door Knobs to Spindles.—11,334, A. and R. Knox, Wood Planing Machines.—11,339, E. Finch, Syphon Flushing Cisterns.

Aug. 20.—11,378, J. Cartland, Attaching Door-knobs to Spindles.

Aug. 22.—11,410, J. Reid, Rendering Doors, Windows, Casements, &c., Draught-proof.—11,424, J. Carter, Air-chambered and Receding Party-walls.—11,434, O. Elphick, Syphon Cisterns.—11,435, A. Allom, Ventilation.—11,438, J. Cantle, Fireproof Holders for Joists for Party-walls.

Aug. 23.—11,490, R. Winn, Syphonic Apparatus for Discharging Water from Flushing Tanks or Cisterns.

Aug. 24.—11,508, R. Harrison, Devices for Opening and Closing Fanlights, Sashes, &c.—11,509, H. Warrington and W. Howlett, Bricks and Building Blocks.

Aug. 25.—11,566.—R. Brenmehl, Door Furniture.

PROVISIONAL SPECIFICATIONS ACCEPTED.

13,209, W. Lutwyche, Producing Mosaics by Means of Enamelled Substances and Coloured Glass.—4,323, F. Smith, Door Springs and Checks.—9,716, J. Hirschfeld, Fastening for Doors.—9,846, P. Bishop, Locking or Fastening Window Sashes, either when wholly or partially Closed.—9,971, S. Hazeland, Machinery for Planing Wood.—10,042, A. Boult, Roof and Roofing Material.—10,054, G. Lundberry, Door, Cupboard, and similar Fastenings.—9,605, G. Innes, Manufacture of Portland Cement, &c.—10,310, A. Sutherland, Service Cisterns and Valves for Water-closets.—10,361, J. Phillips, Ventilation of Sewers.—10,511, W. Swettenham, Automatic Flushing Apparatus for Water-closets.—10,550, J. Rickard, Tip Wagons and Carts.—3,950, J. Inshaw, Domestic Fireplaces.—9,757, J. Turner, Explosive Alarm for the Protection of Windows, Doors, &c.—9,984, G. Parkinson, Headstones, Curbings, and Palisadings combined.—10,086, J. Dungey, Cup-and-ball Joints for Gas-fittings.—10,292, J. Rhodes, Door Bolts.—10,449, R. Bettle, Boring Bits.—10,816, J. Gowland Chimney Tops, Ventilators, and Cowls.—9,627, F. Pilkington, Fireproofing Columns, Stanchions, Girders, Ceilings, Walls, &c.—9,695, W. Wise, Windows and Window Fittings.—10,244, J. Rigby, Manufacture of Cement.—10,324, H. Matthews, Portland Cement.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

12,514, T. Lane, Window-sash Fastenings.—13,033, M. Heighley, Syphon Flushing Cisterns.—3,431, J. Duckett, Water-closets.—6,381, F. Ferguson, Clay, Terra Cotta, or Cement Blocks having a hollow Tube formed in same, and constructed to form a Continuous Pipe on the Faces of Buildings.—9,908, H. Henry, Cowl or Chimney Cap.—11,637, M. Macleod, Dry Glazing.—13,209, W. Lutwyche, Producing Mosaics by Means of Enamelled Substances and Coloured Glass.—13,436, J. Harrington, Spirit Levels.—13,445, D. Anderson, Flushing Apparatus.—13,468, G. Wickham, Syphon Cisterns.—15,419, J. Hodges, Mortise and Rim Locks.—10,250, C. Rogers, Wood Screws.—13,555, J. Horrocks, Ventilation of Buildings, Sewers, &c.—14,146, W. Bevan, Sash Fastener.—16,105, J. Craig, Outlet Ventilators.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

AUGUST 18.

By WORSFOLD & HAYWARD.

Dover—3, St. James-lane, freehold	£240
4, Cowgate-hill, 93 years, ground-rent 2*l.*	235
9, Waterloo-crescent, 46 years, ground-rent 10*l.*	1,175
5 to 8, Saxon-street, 39 years, ground-rent 4*l.*	1,460
7, Effingham-crescent, 39 years, ground-rent 4*l.* 11s.	700
5, York-street, freehold	325
11, Market-square, freehold	1,225
Maxton, near Dover, Hardwick-road—Kent cottage, freehold	220

AUGUST 22.

By SEDGWICK, SON, & WEALL.

Paddington—9, 10, and 15, Amberley-road, 75 years, ground-rent 18*l.*	780

AUGUST 23.

By DEBENHAM, TEWSON, & Co.

Pimlico, Hugh-street—An improved ground-rent of 8*l.*, term 39 years	120

By A. RICHARDS.

Wood Green—3, 4, and 5, Sussex-terrace, 78 years, ground-rent 15*l.* 15s.	360
11 and 12, William's-terrace, 76 years, ground-rent 9*l.*	210

By ROGERS, CHAPMAN, & THOMAS.

Streatham, Lewin-road—A plot of freehold land	260

AUGUST 24.

By F. HOLLOWAY.

Stoke Newington—6, Defoe-road, 77 years, ground-rent 5*l.* 10s.	150

By R. TOMLINSON & Co.

Maida Vale—5, 6, and 7, Elgin-terrace, 74 years, ground-rent 21*l.*	1,100
Barking—5 and 6, Axe-street, 96 years, ground-rent 15*l.*	535
1 to 24, Cooke-street, leasehold	1,940

AUGUST 25.

By BEADEL & Co.

Stanford-le-Hope, Essex—Three enclosures of freehold land, 8a. 0r. 23p.	730

By W. W. JENKINSON.

Isle of Ely—Hobourn's farm, 113a. 3r. 1p., freehold	2,170

By TOPLIS & ROBERTS.

Streatham—Pembroke House, 57 years, ground-rent 40*l.*	2,950

By E. STIMSON.

Kennington—60, 61, and 62, Walcot-square, 20 years, ground-rent 30*l.*	575
64 and 65, Walcot-square, 20 years, ground-rent 12*l.*	395
Lambeth—20 and 21, Crozier-street, 37 years, ground-rent 16*l.* 13s. 4d.	700
Peckham—36, 38, and 40, Brayard-road, 80 years, ground-rent 9*l.* 16s. 6d.	705
Balham, Larch-road—A plot of freehold land	400
Whitechapel, Graces-alley—Ground-rent of 6*l.* 5s., reversion in 5½ years	260
Westminster Bridge-road—2 to 5, Duke-street, 31 years, ground-rent 1s.	770
Camberwell—2, 4, and 18, Victory-square, 98 years, ground-rent 15*l.* 15s.	390

By NEWBON & HARDING.

Clerkenwell—9, Arlington-street, 24 years, ground-rent 6*l.* 6s.	320
Barnsbury—6, Brooksby-street, 22 years, ground-rent 5*l.* 5s.	300
Holloway-road—30, Hornsey-road, freehold	270
34, Hornsey-road, freehold	275
Stoke Newington—28 to 34 even, Woodlea-road, 86 years, ground-rent 23*l.*	940
64, Lordship-road, 56 years, ground-rent 8*l.*	370
Highbury—77 to 85 odd, Highbury-quadrant, 62 years, ground-rent 37*l.* 10s.	2,000
Hornsey-road—113, 115, and 117, Corbyn-street, 83 years, ground-rent 18*l.* 18s.	£720
115, Thorpedale-road, 83 years, ground-rent 5*l.* 12s. 6d.	190

AUGUST 26.

By C. D. FIELD & SONS.

Camberwell—1 to 11, Bonsor-street, 74 years, ground-rent 47*l.* 4s.	2,320

Miscellanea.

University College, Bristol. — This College has been recently enabled to make a notable advance in the matter of engineering education, owing to the generosity of local firms. At a meeting held in the early part of the present year, under the presidency of Mr. Alfred Fry, the desirability of instituting engineering scholarships was considered. The practical outcome of this meeting was that most of the firms of the neighbourhood agreed to institute Bursaries or Scholarships at their works. The holders of these are to be nominated by the College authorities. Some will be awarded on the results of the annual examinations, while others will be reserved for deserving students who may be unable to pay the usual premiums required on entrance into the works. The educational scheme adopted at Bristol does not include any attempt to impart practical workshop instruction within the College walls, but the students spend six months (April to October) in each year acquiring practical experience in the works and drawing-offices of engineers in the West of England. This system is stated to answer so well that Messrs. Stothert & Pitt, of Bath, and the Bristol Wagon Works Company propose to make it obligatory on all their pupils to attend the College courses in the winter months for the first three years of their pupilage. Several firms have also signified their willingness to take College students for short periods, so that civil engineering and electrical engineering pupils may spend one or two terms of six months in works, while at the same time mechanical engineers may have experience in two or three different establishments during their College career. In return for these concessions, the Council of the College has decided to permit deserving apprentices or artisans, nominated by the local engineers, to attend the College courses at reduced rates. It is expected that about nine first-class scholarships and a larger number of second-class ones will be available during the coming session. The following are the names of the firms which have already placed at the disposal of the College authorities one or more Scholarship places in their works, on exceptionally favourable terms:—Messrs. Stothert & Pitt, Bath; The Bristol Wagon Works Company, Bristol; Messrs. Cox & Co., Falmouth; Messrs. Newall & Co., Bristol; Messrs. Willoughby Bros., Plymouth; Messrs. Bush & De Soyres, Bristol; Mr. Thos. Beckett, Atlas Engine Works, Bristol; Messrs. John Watts & Co., Bristol; and Messrs. Spencer & Co., Melksham, Wilts.

Isothermal System of Building.—This new system of building (according to the *Deutscher Dachdecker*), is principally based upon the employment of iron in layers between which isolating agents (air and materials of organic composition) are alternated in such a manner as to effect complete protection against cold as well as heat. The various parts of the buildings being constructed in factories, expedition and cheapness are insured. There is comparatively little brickwork, it being only used in the cellars, foundations, and chimneys. As soon as the last coat of oil-paint is dry, the house is ready for occupation. The building of such a house takes four to five weeks, and can be carried on in winter as well as in summer. The inventor of the system, Herr. Hielemann, of Berlin, claims, moreover, that it insures complete dryness, and a saving of about one-third in the cost of building. It is, however, only applicable to structures not more than two stories high, such as agricultural and industrial buildings, dwelling-houses, villas, workmen's dwellings, &c. Cottages with two rooms and cellars, &c., can be erected for 112*l.* 10s., this sum including stove, painting, paper-hanging, &c. Villas with five rooms cost 240*l.*, and with eight rooms, 450*l.* Sheds, stables, and similar erections, can be put up from 1s. per square foot of surface built over. The use of oil-paint gives these structures a cheerful appearance. A building executed on this plan may be seen at the Berlin goods station of the Potsdam Railway.

The Rebuilding of Chelmsford Workhouse.—At a meeting of the Guardians of Chelmsford Union, held last week, the chief business before the Board was the consideration of the plans submitted for the rebuilding of the Union House. Mr. E. Corder (Chairman) presided, and there were twenty-six other Guardians present. At a previous meeting it was decided to ask Mr. F. Chancellor, Mr. C. Pertwee, and Mr. F. Whitmore, architects, of Chelmsford, to send in plans for the new building. All three gentlemen did so, and the plans were referred by the Guardians to a Building Committee for examination. This committee now presented their report as under:—"The Clerk submitted to us three schemes and plans which he had received from the architects for the re-erection of the workhouse, bearing the several mottos, 'Union is Strength,' 'Kelpie,' and 'Adaptation.' The committee having carefully examined the plans, it was resolved that they cannot recommend the adoption of the plans by 'Kelpie,' The plans of the other two competitors were then put to the vote, when there appeared six in favour of 'Union is Strength' and four in favour of 'Adaptation.' It was, therefore, resolved that the guardians be recommended to adopt the scheme and plans sent in with the motto 'Union is Strength.'" After some discussion, the Chairman moved, Mr. A. C. Veley seconded, and it was resolved, that the report of the committee be received and adopted. The closed letter bearing the motto "Union is strength" was opened, and it was found that the accepted plans were those of Mr. F. Chancellor. The plans marked "Adaptation," which seriously competed in committee with those approved by the Guardians, belonged to Mr. C. Pertwee; and those marked "Kelpie" to Mr. F. Whitmore. The Building Committee were then instructed to meet Mr. Chancellor and complete the plans and specifications for the Local Government Board.

The Stavanger Cathedral, Norway.—In a recent article on the state of this cathedral the Norwegian technical journal *Teknisk Ugeskrift* says:—"During recent years the work of restoring this celebrated Norwegian edifice, the second cathedral in Norway after that of Throndhjem, has, thanks to the munificence of the corporation of this city, been almost completed, and the building is now one of the sights which no artistic visitor to Norway should miss, though the position of the town, by being somewhat out of the ordinary tourist track, has rendered this cathedral less known than its prototype at Throndhjem. The cathedral of Stavanger was built in the middle of the twelfth century by one Reinald or Ragnhald, a monk from the Winchester Cathedral, who, by the order of King Sigurd Jerusalemfarer, brought over workmen from England for this purpose. This explains the remarkable similarity between certain parts of these two cathedrals, and also why the first cathedral was consecrated to St. Swithin, Bishop of Winchester, 837-862. In 1272 the cathedral was almost destroyed by fire, and it was not till the middle of the fifteenth century that it was fully restored. At that period it attained the greatest magnificence, having eighteen altars, &c.; but the Reformation soon destroyed all this, and for three centuries the edifice remained to decay, stripped of all its interior ornaments. In the middle of the eighteenth century the whole interior was, by the order of some Vandal authority, "whitewashed," a process whereby all the fine Gothic tracery and ornaments were obliterated. It is curious to know that about the same period a similar outrage was perpetrated in the Throndhjem Cathedral. Thus it remained until 1867, when some art-loving corporation of the city decided upon restoring the cathedral as near as possible to its ancient magnificence, on a plan submitted by a well-known Norwegian architect, Herr von der Lippe, and this work has since been carried out most satisfactorily, the principal and most arduous task being to remove the "whitewash" referred to. The nave, the oldest part of the cathedral, is over 100 ft. in length and about 60 ft. in width. It is built of grey granite, with sandstone cornices, window and door frames. In the manner of basilican churches, the nave is divided into two lower side naves and one central nave, 40 ft. in height, the whole being covered by a wooden roof. All along the centre of the nave run two rows of pillars, joined by arches, in Norman style, the latter bearing on the inside zigzag tracery, whilst, curiously enough, the capital of one is ornamented with old Pagan Norse dragon tracery. On the west side there has once been a large tower, but it has been found impossible to rebuild this on account of the walls of the cathedral now deviating from the perpendicular. The choir, which in all probability dates from the fire in 1272, is 70 ft. in length, and with the same height and width as the nave. It is chiefly built of sandstone, and in the richest Anglo-Gothic style, and is one of the finest pieces of ancient architecture in Scandinavia. The roof is supported by Gothic pillars and groined, the windows being ornamented with beautiful foliation. In the east gable is a large, handsome stained-glass window, with figures of the four Evangelists. There is also a magnificently-carved baptismal font of sandstone, dating from the earliest time of the cathedral.

The London Parochial Charities Act, 1883.—By an Act of the current session the Ecclesiastical Commissioners, as owners, are authorised to sell about 53 acres of Clissold Park, Stoke Newington, to the Metropolitan Board of Works and the Hackney District Board, or to either of them, for preservation as an open space. The purchase-money is to be contributed by various metropolitan parish and district Boards, including the South Hornsey Local Board, into whose parish portion of the park extends. The Act further provides for a contribution not exceeding 47,500*l.* being made out of the charity funds dealt with by the London Parochial Charities Act of 1883. The Coal, Corn, and Finance Committee of the Common Council have just reported in favour of the making of this last-named contribution. At a delegates' meeting of the London Trades' Council, held on Tuesday, 23rd August, in the Memorial Hall, Farringdon-street, a resolution was passed, on the motion of Mr. C. J. Drummond, Secretary to the London Society of Compositors, supporting the Charity Commissioners' scheme for erecting technical schools,—"in the best sense of the word,"—in various parts of the metropolis. It is proposed to erect the first one on the site of Farringdon, *olim* Fleet, Market, the cost to be defrayed out of the parochial funds of St. Bride's under provision of this Act.

PRICES CURRENT OF MATERIALS.

TIMBER.	£. s. d.	£. s. d.
Greenheart, B.G. ....ton	5 10 0	7 10 0
Teak, E.I. ....load	8 10 0	13 0 0
Sequoia, U.S. ....foot cube	0 2 3	0 3 0
Ash, Canada ....load	3 0 0	4 10 0
Birch ,, ...	2 0 0	3 10 0
Elm ,, ...	3 10 0	4 10 0
Fir, Dantsic, &c.	1 10 0	4 0 0
Oak ,, ...	2 10 0	4 10 0
Canada	3 0 0	6 0 0
Pine, Canada red	2 0 0	3 10 0
,, yellow	2 0 0	4 0 0

TIMBER (*continued*).	£. s. d.	£. s. d.
Lath, Dantsic ....fathom	3 0 0	5 0 0
St. Petersburg	4 0 0	5 10 0
Wainscot, Riga ....log	0 0 0	0 0 0
,, Odessa, crown....	2 10 0	3 0 0
Deals, Finland, 2nd and 1st...std.100	7 0 0	8 0 0
,, 4th and 3rd....	5 10 0	6 10 0
Riga	5 10 0	7 0 0
St. Petersburg, 1st yellow	8 0 0	13 0 0
,, 2nd ,, ...	7 0 0	8 0 0
,, white	8 10 0	8 10 0
Swedish	0 0 0	0 0 0
White Sea	0 0 0	0 0 0
Canada, Pine, 1st	16 0 0	24 0 0
,, ,, 2nd....	10 0 0	15 0 0
,, ,, 3rd, &c....	6 0 0	9 0 0
,, Spruce, 1st	8 0 0	9 0 0
,, ,, 3rd and 2nd....	5 0 0	7 0 0
New Brunswick, &c....	5 0 0	6 10 0
Battens, all kinds	4 0 0	10 10 0
Flooring Boards, sq., 1 in., prepared, First....	0 8 0	0 11 0
Second	0 6 6	0 7 6
Other qualities	0 4 0	0 6 0
Cedar, Cuba ....foot	0 0 3½	0 0 3½
Honduras, &c.	0 0 3	0 0 3½
Australian	0 0 2	0 0 3
Mahogany, Cuba	0 0 4	0 0 6
St. Domingo, cargo average	0 0 4	0 0 5½
Mexican ,, ...	0 0 3½	0 0 3½
Tobasco ,, ...	0 0 3½	0 0 5
Honduras ,, ...	0 0 3½	0 0 5
Maple, Bird's-eye	0 0 5	0 0 7
Rose, Rio ....ton	8 0 0	11 0 0
Bahia....	7 0 0	9 0 0
Box, Turkey ....ton	5 0 0	12 0 0
Satin, St. Domingo ....foot	0 0 5	0 0 9
Porto Rico	0 0 6	0 0 10
Walnut, Italian	0 0 3½	0 0 5½
METALS.		
IRON—Bar, Welsh, in London...ton	4 7 6	4 15 0
,, ,, in Wales	4 2 6	4 7 6
,, Staffordshire, London	5 10 0	6 0 0
Sheets, single, in London	0 0 0	0 0 0
Hoops ,, ...	0 0 0	0 0 0
Nail-rods ,, ...	0 0 0	0 0 0
COPPER—		
British, cake and ingot ....ton	43 10 0	44 0 0
Best selected	44 10 0	45 10 0
Sheets, strong....	50 0 0	0 0 0
Chili, bars	40 7 6	40 15 0
YELLOW METAL ....lb.	0 0 0	0 0 0
LEAD—		
Pig, Spanish ....ton	11 18 9	0 0 0
English, common brands....	12 2 6	12 5 0
Sheet, English	13 3 9	0 0 0
SPELTER—		
Silesian, special ....ton	14 17 6	15 0 0
Ordinary brands....	14 15 0	14 17 6
TIN—		
Straits....ton	103 0 0	0 0 0
Australian	103 2 6	0 0 0
English ingots	106 5 0	0 0 0
ZINC—		
English sheet ....ton	0 0 0	0 0 0
OILS.		
Linseed ....ton	20 17 6	21 2 6
Cocoanut, Cochin	30 0 0	33 0 0
Ceylon	23 15 0	24 0 0
Palm, Lagos	21 10 0	22 0 0
Rapeseed, English pale	23 10 0	23 15 0
,, brown	22 5 0	0 0 0
Cottonseed, refined	20 15 0	21 0 0
Tallow and Oleine....	25 0 0	45 0 0
Lubricating, U.S....	5 0 0	6 0 0
,, refined....	5 0 0	12 0 0
TURPENTINE—		
American, in casks ....cwt.	1 5 9	1 16 0
TAR—		
Stockholm ....barrel	0 14 0	0 14 6
Archangel	0 9 6	0 9 9

CONTRACTS AND PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

CONTRACTS.

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Repairs to Shire Hall	County of Hertford....	Urban A. Smith....	Sept. 9th	ii.
Guernsey Granite	Gravesend U. S. A.....	*Official*	Sept. 10th	ii.
Supply and Delivery of Granite	Woodford Local Board	J. W. Hooper	do.	ix.
New School Buildings, Skipton	The Governors	*Official*....	do.	ii.
Disinfectants	St. Luke's Vestry.....	do.	do.	ii.
Widening Green Lanes	Tottenham Local Board	— De Pape....	Sept. 12th	ii.
Engine-House, &c.	do.	do.	Sept. 13th	ii.
Broken Granite and Granite Curb	East Ham Local Board	W. H. Savage	do.	ii.
Taking-down and Rebuilding Bridge	Kent Justices of the Peace....	F. W. Ruck....	Sept. 14th	ix.
Turret Clock	Malvern Local Board...	J. E. Palmer	Sept. 17th	ii.
Drainage Works	Central London Sch. Dis.	A. Allen, Jun.	Sept. 19th	ix.
Repairing, Cleansing, and Painting School, &c.	do.	H. Jarvis & Son	do.	ix.
Erecting and Enlarging Schools, Repairs, &c.	School Brd. for London	*Official*	Not stated...	ix.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Clerk of Works	Aston Bd. of Guardians	3*l.* 10*s.* weekly	Sept. 12th	xiv.
Draughtsman and Assistant Surveyors	Civil Service Com.	Not stated	Sept. 27th	xiv.

TENDERS.

BROMLEY.—Additions to "Invicta Works," Bromley-by-Bow. Mr. Chester Foulsham, architect. Quantities by Mr. Charles H. Goode:—

Atherton & Latta....	£2,430 0 0
Palmer....	2,365 0 0
Shepherd	2,282 0 0
Brass & Son	2,251 0 0
Johnson	2,246 0 0
Harris & Wardrop	2,223 0 0
Walker	2,218 0 0

BROMLEY (Kent).—For sewer extensions, for the Bromley Local Board. Mr. Hugh S. Cregeen, surveyor:—

G. Osenton....	£1,209 0 0
Woodhams & Fry	955 0 0
A. T. Cattley....	884 0 0
E. & W. Iles	860 0 0
Grindle	805 0 0
J. H. Mollett....	793 0 0
R. Nicholson	778 0 0
H. Potter	764 0 0
E. Peill & Sons....	740 0 0
F. Lansbury (accepted)	719 0 0

CARLISLE.—Accepted for gutting and converting into six dwelling-houses the old Whip Manufactory, for Mr. Jno. R. Armstrong. Mr. Charles Armstrong, architect, Carlisle:—

Bricklayer and Mason.

Alex. McGuinness, Carlisle	£143	3	0

Carpenter and Joiner.

Joseph Hindson, Carlisle	71	7	0

Plasterer.

Samuel Fergusson, Carlisle	35	10	0

Cement and Fireproof Floors.

Samuel Fergusson	62	10	0

Plumber.

George Sowerby	15	0	0

Painting and Glazing.

David Canning	11	8	6

DARENTH (Kent).—For external painting and repairs to the Asylum for Imbeciles, Darenth, near Dartford, Kent, for the Managers of the Metropolitan Asylum District. Messrs. A. & C. Harston, architects, 15, Leadenhall-street. Quantities not supplied:—

A. Sewell	£2,450	0	0
W. Tuffee	1,595	0	0
Cullen & Co.	1,392	1	5
Vigor & Co.	1,170	0	0
G. Foxley	1,030	0	0
McLachlan	974	0	0
E. Proctor	885	0	0
W. Hadlow, 72, Biggin-street, Dover*	685	18	3

* Accepted.

DARENTH (Kent).—For alterations and additions to the mortuary at the School for Imbecile Children, Darenth, Kent, for the Managers of the Metropolitan Asylum District. Messrs. A. & C. Harston, architects, 15, Leadenhall-street:—

W. Shurmur, Lower Clapton (accepted)	£269	10	0

HUCKNALL TORKARD.—For the enlargement of the Parish Church, Hucknall Torkard. Mr. Robt. C. Clarke, architect, Nottingham:—

Parnell & Son, Rugby	£4,428	0	0
Dennett & Ingle, Nottingham	4,383	0	0
Thompson, Peterborough	4,354	0	0
Hodson & Son, Nottingham	4,081	0	0
Rudd & Son, Grantham	4,081	0	0
Vickers, Nottingham	4,050	0	0
Smith & Lumn, Newark	3,900	0	0
Fish & Son, Nottingham (accepted)	3,734	0	0

KING'S LYNN.—For building furnishing store at King's Lynn (bricks and plate-glass being found by the proprietor), for Mr. Alfred Jermyn. Mr. W. Adams, architect:—

R. Dye (accepted)	£1,238	0	0

[Eight tenders were received, the amount of the highest being 1,820*l.*]

LEYTONSTONE.—For the completion of the Bethnal Green Schools at Leytonstone, Essex, for the Guardians. Messrs. A. & C. Harston, architects, 15, Leadenhall-street. Quantities supplied:—

Third Contract.

J. & H. Cocks	£23,999	0	0
Ingram & Son	23,318	0	0
H. & H. F. Higgs	22,450	0	0
J. Holland	22,350	0	0
R. Edwards	22,210	0	0
D. Brown & Co.	22,170	0	0
W. Johnson	22,000	0	0
S. Grist	21,988	0	0
Jackson & Todd, 192, Hackney-road*	21,650	0	0
J. S. Robson, Snaresbrook	21,384	0	0

* Accepted. Messrs. Jackson & Todd carried out Contracts Nos. 1 and 2.

LONDON.—For alterations and additions to the Roebuck Tavern, Hackney-road, for Messrs. Bruce Bros. Messrs. Williams & Son, architects:—

J. Anley	£987	0	0
Thomerson	969	0	0
Ivory	945	0	0
Jackson & Todd (accepted)	915	0	0

LONDON.—For the erection of factory and warehouse, at Mount-street, Bethnal Green, for Messrs. Nicholson & Sons. Mr. C. K. Winter, architect:—

Jackson & Todd*	£5,570	0	0

* Revised estimate accepted.

LONDON.—For the erection of the Olive Branch Tavern, Waterloo-road, for Messrs. Hart & Son. Mr. J. G. Finch Noyes, architect:—

Patrick	£6,937	0	0
Boyce	6,862	0	0
Patman & Co.	6,672	0	0
Killby & Gayford	6,598	0	0
Lawrence & Son	6,485	0	0
Canning & Mullens	6,455	0	0
Spencer & Co.	6,350	0	0
Jackson & Todd (accepted)	6,290	0	0

LONDON.—For alterations and additions to the Colchester Arms, Salisbury-street, Jamaica-road, Bermondsey. Messrs. Williams & Son, architects:—

Staines & Son	£724	0	0
Salt	614	0	0
Jackson & Todd (accepted)	589	0	0

LONDON.—For alterations and additions at George-yard, Soho-square, for Messrs. A. Goslett & Co. Mr. S. C. Capes, architect. Quantities not supplied:—

Bush	£735	0	0
Chappell	633	0	0
Lawrence	565	0	0
Nightingale	523	0	0

LONDON.—For gasfitting works at the Crown] and Anchor, Finsbury:—

Earl & Philps	£123	10	0
Green & Son	114	0	0
Clark	94	7	6
W. Winn (accepted)	85	0	0

LONDON.—For building new ball-room at 16, Salisbury-road, Dalston, for Mr. Hind. Mr. Wm. Shrosbridge, architect:—

Steel Bros.	£260	0	0
Dearing & Son	260	0	0
Anley	240	0	0

LONDON.—For the erection of a house in Egerton-gardens, South Kensington, for Mr. W. Whetherley. Mr. T. H. Smith, architect, 17, Basinghall-street:—

Matthews & Co.	£4,400	0	0*

* Exclusive of internal painting and decorations.

LONDON.—For rebuilding the Goat in Boots public-house, Fulham-road, and the erection of three houses and shops on site adjoining, for Mr. W. Prangnell. Mr. T. H. Smith, architect, 17, Basinghall-street. Quantities by Mr. J. T. Walford, 110, Buckingham Palace-road:—

	Public-house.	Houses.	Total.
W. Gregar	£4,914	£3,337	£8,251
J. & J. Greenwood	4,815	3,185	8,000
Patman & Fotheringham	4,704	3,210	7,914
E. Lawrence & Sons	4,701	3,016	7,717
Holliday & Greenwood	4,579	2,992	7,591
Jackson & Todd	4,235	2,690	6,925
Spencer & Co	4,167	2,700	6,907
Turtle & Appleton*	4,025	2,799	6,857

* Accepted subject to modifications.

ORPINGTON (Kent).—For Mission Chapel at Crofton. Mr. St. Pierre Harris, A.R.I.B.A., architect and surveyor, 1, Basinghall-street, and Orpington:—

H. Somerford & Son, Clapham	£485	0	0
W. Holt, Croydon*	469	0	0

* Accepted with additions at 520*l.*

PORTSMOUTH.—For reseating, alterations, heating apparatus, cleaning, and painting, &c., Daniel-street Wesleyan Chapel, Portsea. Mr. A. E. J. Guy, architect, Albert-road, Southsea. Quantities by Mr. Jas. W. Stroud, 33, Lion-terrace, Portsea:—

Matthews Bros., Portsea	£1,336	11	6
F. Francis, Southsea	1,298	0	0
W. R. & C. Light, Landport	1,109	0	0
T. Bowler, Stamshaw	1,039	0	0
Crook & Sons, Southampton	1,022	0	0
C. Dye, Landport	1,009	0	0
F. White, Landport	1,001	0	0
E. & A. Spriggings, Stamshaw	923	0	0
J. Crockerell, Landport	905	0	0
Outridge & Reading, Landport	897	0	0
Scammell & Dowdell, Landport	877	0	0
T. Quick, Southsea	837	0	0
T. P. Hall, Bedford-road, Southsea*	720	0	0

* Accepted.

PORTSMOUTH.—For reseating, gallery front, rostrum, and painting and decorating the Wesley Chapel, Arundel-street, Landport. Mr. A. E. J. Guy, architect, Albert-road. Quantities by Mr. Jas. W. Stroud, Lion-terrace, Portsea:—

J. Crockerell, Landport	£1,200	0	0
W. Learmouth, Landport	1,105	0	0
W. Coltherup, Landport	1,083	0	0
Windebank, Portsea	1,070	0	0
R. Stokes, Southsea	1,050	0	0
C. Dye, Landport	1,036	0	0
T. W. Quick, Southsea	987	0	0
T. P. Hall, Southsea	981	0	0
Scammel & Dowdell, Wingfield-street, Landport (accepted)	975	0	0

READING.—For erecting new house in Hamilton-road, Reading, for Mr. C. Batho. Mr. Jos. Morris, architect, Reading:—

John Bottrill, Reading (accepted)	£675	0	0

[No competition.]

ROMFORD (Essex).—For erecting a cottage hospital. Messrs. Frank Brown & John S. Corder, joint architects, 9, Thorofare, Ipswich:—

Hines*	£710	0	0
Hammond & Son	664	0	0
Downing & Davis (accepted)	600	0	0
Booth	584	0	0

SANDY (Beds).—For the erection of Baptist Chapel, Sandy. Messrs. Usher & Anthony, architects, 9, St. Paul's-square, Bedford:—

Kimberley, Banbury	£2,439	0	0
Jacklin, Royston	2,400	0	0
Foster, Kempston	2,296	0	0
White, Bedford	2,255	0	0
Harrison, Bedford	2,220	0	0
Saint, Cambridge	2,184	0	0
Warton & Walker, Bedford	2,140	0	0
Page, Buckden	2,025	0	0
Rainsford & Bartle, Potton	1,944	0	0
Peters, Potton	1,909	0	0
Woodman, Potton	1,898	0	0
Ellwood & Son, Sandy	1,865	0	0
Wade, St. Neots (accepted)	1,798	0	0

SOUTH SHIELDS. — For alterations to business premises, for Mr. T. A. Dry, jun. Mr. Henry Grieves, A.R.I.B.A., architect:—

Jos. Wright, South Shields	£476	17	0
Charles F. Temple, South Shields	410	10	0
Gilfillan & Hall, South Shields	365	10	0
George Goddard, South Shields	355	0	0
Nicholas Napier, South Shields	339	0	0
William Scott, South Shields	333	10	0
John Yeeles, Jarrow	305	0	0
W. J. Robertson, South Shields	299	11	0
Stephen Sheriff, South Shields*	285	0	0
John Shields, South Shields	230	0	0

* Accepted.

WANDSWORTH.—For lifts at the Infirmary extension, St. John's Hill, New Wandsworth, for the Guardians of the Wandsworth and Clapham Union. Mr. Thos. W. Aldwinckle, architect, 2, East India-avenue:—

G. Scott & Son	£360	0	0
Clark, Bunnett, & Co.	245	10	0
Geo. Johnson	235	15	0
Archd. Smith & Stevens	198	15	0
Waygood & Co	196	15	0
W. R. Dell & Son	188	0	0
Atwood & Co.	180	0	0
T. Thomas & Sons	176	0	0
Middleton	122	0	0

WEST MARDEN (Sussex).—For completing house and stables at West Marden, Sussex, for Mr. Alexander Beale. Mr. William J. Martin, F.R.I.B.A., architect, Reading:—

Robert Pink, Godalming	£594	0	0
J. & A. Gammon, Petersfield	551	0	0
J. Crook & Sons, Southampton	507	17	6
Snell & Co., Maidenhead	490	0	0
Couzens & Chase, West Marden	454	11	0
Joseph King	373	17	7

WIX (Essex).—For the erection of new chancel, and restoration and reseating the nave, of St. Mary's Church, for the Vicar and Wardens. Messrs. Wadmore & Baker, architects, 35, Great St. Helens, London. Quantities supplied:—

	Chancel.	Nave.	Total.
Alfred Coe, Ipswich	£410	£463 10	£873 10
J. Grimes, Colchester	395	453 0	848 0
Everett & Son, Colchester	370	460 0	830 0
O. T. Gibbons, Ipswich	360	365 0	725 0
A. Brown, Braintree*	325	373 0	698 0

* Accepted.

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GLASGOW: Petershill-road.

WALTHAMSTOW.—For erecting and completing new school for boys, girls, and infants on the site in Pretoria-avenue, for the Walthamstow School Board. Mr. W. A. Longmore, architect, 7, Great Alie-street. Quantities by Messrs. J. E. Goodchild & Son :—

Reed, Walthamstow	£10,159	0	0
Hubbard, East Dereham, Norfolk	10,100	0	0
Bosley & Son, Walthamstow	10,040	0	0
Priestley & Gurney, Hammersmith	9,760	0	0
Barrett & Power, Hackney	9,675	0	0
Hicks, Stamford Hill	9,470	0	0
Holland, Limehouse	9,056	0	0
Castle, Borough	8,813	0	0
Scott, Walthamstow	8,693	0	0
Parker, Peckham	8,670	0	0
Sayer, Leyton	8,515	0	0
Tagg, Bethnal Green	8,510	0	0
Godfrey & Son, Clapton	8,417	0	0
Evans, Peckham	8,120	0	0
Green & Lee, Hackney (accepted)	7,997	0	0

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TO CORRESPONDENTS.

Registered Telegraphic Address, "THE BUILDER, LONDON."

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All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication

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